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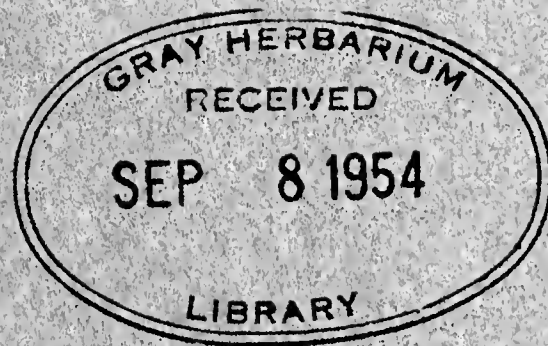
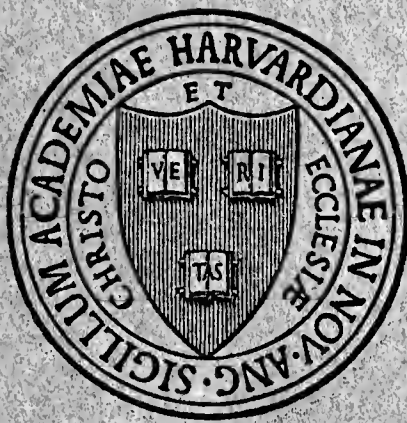
V

THE FLORA OF
BARRO COLORADO ISLAND
PANAMA

BY

PAUL C. STANDLEY

WITH TWENTY-ONE PLATES AND A MAP



PUBLISHED BY
THE ARNOLD ARBORETUM OF HARVARD UNIVERSITY
JAMAICA PLAIN, MASS., U.S.A.

1933

CONTRIBUTIONS FROM THE ARNOLD ARBORETUM
OF HARVARD UNIVERSITY

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THE FLORA OF BARRO COLORADO ISLAND,
PANAMA

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MAP OF THE ISLAND

THE FLORA OF BARRO COLORADO ISLAND, PANAMA

INTRODUCTION

Among scientists acquainted with the natural history of tropical America, Barro Colorado already is a familiar name, but doubtless there are many others who never have heard of this fascinating and distinguished island that rises from the waters of a vast, artificial lake on the Isthmus of Panama. The latter, as well as all persons having the slightest interest in the tropics, are urged to read *MY TROPICAL AIR CASTLE*, by Dr. Frank M. Chapman. That charming volume gives an intimate picture of life, particularly bird life, as it exists on Barro Colorado, with a sympathy of treatment such as few other books have achieved. Fortunate is an island with so gifted and sympathetic a historian, but fortunate also is the scientist privileged to sojourn for few or many days in a place so alluring.

Barro Colorado Island, with an area of six square miles, is about three miles in greatest diameter, and has an exceedingly irregular outline, with many coves and bays. Not many years ago it was merely an undistinguished hill in the valley of the Chagres River, but when that stream was dammed, to provide water for the operation of the Panama Canal by the formation of Gatun Lake, the hilltop remained as an island. Now it has every appearance of always having been an island, since artificial edges have been occupied by the aquatic and marsh plants that characterize other Panama shores of natural origin.

The island consists of a mass of hills, some of which have steep slopes, and are separated by shallow ravines through which trickle insignificant streams. The highest point of the island is 537 feet above sea level, and 450 feet above the level of Gatun Lake. Since the area is well drained, there is little ground adapted to moisture-loving plants, except along the shores, which measure 25 miles in length.

On its northern side the island is separated from the mainland merely by a narrow channel, formed by a diversion canal

dating back to the days of the French canal. Southward spreads the main expanse of Gatun Lake, traversed by the canal. On the distant shore is Frijoles, a station on the historic railroad crossing the Isthmus from Colon to Panama City.

The greater part of Barro Colorado Island is overgrown with dense forest and jungle, but there are certain limited areas of deforested land, occupied until rather recently by squatters. At present these have been invaded by the customary succession of vegetation in such places, and before many more years have passed they will be reforested. Rising above the surface of the lake there still are weathered tree trunks, remnants of the forest drowned when Gatun Lake was filled with water. These melancholy snags, at first heavily draped with orchids, aroids, ferns, bromeliads, and other epiphytes, still support a limited growth of "air plants."

One would be rash to state that Barro Colorado is covered with virgin forest, for it is somewhat questionable whether virgin forest exists about the Canal Zone. But it is evident that for many years the island's forest has been little disturbed. Today it is as nearly primeval as any existing in the immediate vicinity, and, indeed, there is little to distinguish it from presumably primeval forest as it exists elsewhere along the Atlantic coast. There is a great abundance of small forest-loving palms and of tree ferns, plants unable to adapt themselves to civilization, whose existence in an area usually is assumed to be proof that it has not been under cultivation, at least for many scores of years.

Barro Colorado Island owes its well merited fame to the fact that it is the site of the laboratory for tropical research maintained by the Institute for Tropical Research, under the direction of the National Research Council. By order of the Governor of the Canal Zone in 1923, the island was designated as a permanent reservation for the protection in its natural state of the plant and animal life of the isthmus. This action was achieved largely through the personal interest and effort of Dr. Thomas Barbour and Mr. James Zetek, whose continued devotion and energy have securely established the success of the laboratory. The importance of the institution already is attested by an extensive bibliography composed of publications based upon work performed by scientists who have worked on

Barro Colorado. Each year sees an increase in the number of persons using the laboratory facilities to perform research of the highest type. The undisputed success that the laboratory has attained must be a matter of intense gratification to those responsible for its establishment.

A botanist from the north can find no better place than Barro Colorado Island in which to make his acquaintance with the luxuriant tropical vegetation that is so unlike the plant life of temperate regions. Giant trees crowded together in dense forests, thickets of shrubs and enormous herbaceous plants set so closely together that a way through them must be cut with a machete; serpentine lianas (in plain English, vines) dangling from the tree tops; tree ferns and palms, large and small; epiphytes of several families, parasites and saprophytes; aquatic plants; mosses, lichens, hepatics, fungi, even such minute plants as desmids and diatoms—all of these are there in the greatest profusion as to both individuals and species. Except for a lack of the expected brilliant flowers, which seldom or never materialize in lowland tropical forest, the newcomer will find his dreams of tropical plant life fully realized.

Although there are other places in Central America where one may find just as interesting vegetation and work under controlled sanitary conditions, with provision for every material comfort, they are not at the command of the average scientist. Barro Colorado laboratory welcomes every serious student and offers almost ideal conditions, for there are comfortable living quarters and adequate facilities for laboratory work. One is safe from malaria, and little annoyed by the insects that in too many places make life miserable. The climate is agreeable, with a heavy rainfall, pleasant rather than otherwise, and comfortably cool nights. Best of all, the wild life is just outside the screens that cover the windows and porches. Seated on the veranda, you may watch monkeys and an infinite variety of birds. Only a few steps from the door lead you to dense forest, and perfect solitude. The forest is accessible by skilfully planned, easy trails that reach almost all parts of the island, and boats are available for investigation of the long shore line.

Botanically Barro Colorado Island is perhaps the most thoroughly known area of equal size in all tropical America,

for during the past nine or ten years it has been explored intensively by a large number of collectors; but let no one assume that even from a systematic standpoint the island has been exhausted. Each new collection of as many as fifty specimens of flowering plants is almost certain to contribute some addition to the list of species. Among the lower plants, which still are practically unknown, the results would be much more remunerative. In other branches of botanical science, the field is almost untouched.

The first list of Barro Colorado plants, published in 1927, enumerated 611 species, nearly all of them obtained by the writer during a day in January, 1924, and one week in November, 1925. The first visit was made before the laboratory was built, when only a faint trail had been blazed for a short distance up the hills. In 1925 an attempt was made to list or collect every plant seen, but during so short a visit, when there were but few trails, only a limited portion of the area could be explored. However, it was felt that a list of more than 600 species was not discouraging for the amount of labor involved.

It is amusing to recall now—it was amusing even at the time—that before visiting Barro Colorado, I was instructed by a man quite unfamiliar with the tropics to make certain that I collected every plant that grew there! No one could assume that he had obtained every species upon any similar tropical area without “skinning” it—cutting down almost every tree and checking the shrubs and herbs one by one. Even then he probably would miss some of the epiphytes, and almost surely many of the lower cryptogams.

As the later Barro Colorado collections have come to the writer’s desk—and practically all of them have been submitted for naming—record has been kept of additions to the first list. A list of additional species, based chiefly on the work of Professor L. A. Kenoyer, was published in 1929, increasing the number of known species to 799; a second, in 1930, brought the total to 862.

During 1931 and 1932 the island was the scene of unprecedented activity upon the part of several botanical collectors, and more specimens of plants were collected than in all former years combined. The final result, as shown by the following list, is a total of 1259 species, a surprisingly large number.

The flowering plants of the whole Canal Zone region, as treated in *THE FLORA OF THE PANAMA CANAL ZONE*, amount to about 2,000 species, and many of that number are plants confined, presumably, to the Pacific slope, particularly to such places as the savannas, that never could be expected on Barro Colorado.

And the end has not been reached even now. There must be several hundred cryptogams yet to be listed, and I will not venture a guess at the final number of flowering plants. It would seem that the increase could scarcely be more than a hundred species, but perhaps that is too conservative an estimate. Little of the recent collecting has been done by persons thoroughly acquainted with a tropical flora, although it must be admitted that some of the best Barro Colorado collections represent the work of persons with no previous experience whatever. As a matter of fact, they seem to have done quite as well as those from whom the best results were to be expected.

The writer's first intention was merely to list the recent additions, which had grown to such a respectable total, but Professor Oakes Ames and Mr. Alfred Rehder have suggested a complete new enumeration of Barro Colorado plants, that might aid investigators working on the island, and also give to botanists generally some idea of the nature of the vegetation of a very limited area of Central America. No geographic unit is quite so satisfactory a field for work as an island, for it has at least the merit of precise boundaries. It is believed that the present list, except for perennial revisions of nomenclature, may serve for a long time to come as a satisfactory basis for plant study on Barro Colorado Island.

A long list of collectors have cooperated to supply material for the following list. The first census of the island flora, although based almost wholly upon the writer's work, contained records of specimens collected by William R. Maxon, F. L. Stevens, C. W. Dodge, A. S. Hitchcock, and O. F. Cook. The second list, under the authorship of Leslie A. Kenoyer and the present writer, utilized the data from a series of 680 numbers obtained by the former in the summer of 1927. The second supplement, issued in 1930, was made possible through material obtained by S. W. Frost, R. H. Wetmore and R. H. Woodworth, and W. N. Bangham and F. M. Salvoza.

The first 1931 collection received for study consisted of 158 numbers obtained in February and March by Professor C. L. Wilson of Dartmouth College. Dr. L. H. Bailey and his daughter, Ethel Zoe Bailey, collected 700 numbers on Barro Colorado in June and July. Except for certain groups determined by specialists, for which lists were submitted, this fine series was named by the writer. It proved to be remarkably rich in additions to the local flora, partly, perhaps, because it was made at a season during which little collecting had been done previously. Dr. Bailey devoted special attention to the palms, most difficult of all tropical plant families, and has prepared a detailed account of them.

D. E. Starry of Pennsylvania State College obtained 328 numbers of plants in July. Otis E. Shattuck of Harvard University collected diligently during the fall and winter months, and assembled the largest series of specimens, beautifully prepared, that ever has been made on the island, 870 numbers, with many duplicates. He gave much of his time to the epiphytic plants, the ones most difficult to collect, reaching them with the aid of climbing irons. His additions to such families as the orchids and aroids are numerous, indeed, and he was almost equally successful in many other groups.

In some respects the most extraordinary of the year's collections was one formed during the autumn by Silvestre Aviles, a Panamanian laborer who acted as assistant to Dr. Bailey. With eyes trained to the woods—and only one who has accompanied a native hunter into the forest knows what this means—he was able to discover a good many curious plants that had escaped eyes less keen. Silvestre can neither read nor write, but his specimens are excellent. After inspecting his collections, one is forced to conclude that the only apparent advantage of a college training to the education of a plant collector is a knowledge of the proper method of numbering specimens! Silvestre insisted on numbering his, with rather appalling, or at least not essentially helpful results.

Approximately 225 numbers of plants were gathered on the island in December and January, 1931-32 by Dr. R. H. Wetmore and E. C. Abbe of Harvard University. Their collection, as will be discovered by examination of the succeeding catalogue, contained many new records. Dr. R. H. Wood-

worth, who already had collected there with Dr. Wetmore, worked upon the island in February, 1932, in company with P. A. Vestal, and sent to the writer about 450 numbers of plants, which supplied many additions to the present list, and numerous records for the rarer species.

The latest collection for examination consisted of material assembled by Dr. Ray Carpenter of Yale University in the course of his studies of the monkeys inhabiting the island. Although small, this series proved to contain several rare species of trees, and at least one that had not been found by other collectors.

The list here presented speaks well for the industry of botanical workers upon the island. It also demonstrates adequately the wealth of the flora, and leaves no doubt of the suitability of the locality as a station for the study of almost any group of plants that can be expected in the lowland rain forest of the Atlantic coast of Central America.

Whoever has worked on Barro Colorado Island must acknowledge the generous and unstinted assistance that he has received from James Zetek, the resident custodian of the laboratory. The present writer is particularly indebted to him for innumerable courtesies that made field work in Panama peculiarly pleasant and profitable. To his unbounded enthusiasm regarding the investigation of all phases of the natural history of Barro Colorado the present exposition of its flora is primarily due. His interest has been directly or indirectly responsible for the accumulation of the ample material now available for study. This is particularly true in the case of the exceptionally rich collection made by Mr. Shattuck, which contributed so many new records for the flora.

Aside from the personal satisfaction that comes from the realization of a task well done and the attainment of success in an undertaking, Mr. Zetek has received no reward, other than continued hard work, from his association with the Barro Colorado Laboratory. It is but small justice to acknowledge here some of the results of his work and that of his several loyal associates, who have labored so unselfishly to make a success of this well-planned and well-administered project.

The writer's own collections, which formed the basis of the first report upon the Barro Colorado flora, are in the United

States National Museum. Most of the latter collections, including a practically complete representation of the whole flora of the island, and forming the largest Barro Colorado collection assembled in one place, are in the herbarium of Field Museum of Natural History. The ligneous flora is well represented in the herbarium of Arnold Arboretum. A reference herbarium, containing most of the species collected during the past year, is deposited in the Barro Colorado Laboratory for the use of students.

The list of species is based upon herbarium specimens determined, unless otherwise indicated, by the writer. Some records of the first list concerned common species noted in the field, of which no specimens were made, but nearly all these have appeared in later collections. It is rather curious that a few plants remembered by the writer as common or conspicuous there have not been collected recently, but this is merely another illustration of the fact that two persons traveling the same trail see or note different objects.

On the following pages no collections are cited for species already reported from the island, except for those described from the locality. Species for which numbered collections are listed are additions to the previously recorded flora of Barro Colorado Island.

For most of the photographs reproduced on plates I-VIII the writer is indebted to Dr. R. H. Wetmore, Mr. O. E. Shattuck and Dr. Wm. H. Weston, Jr.

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO

ENUMERATION OF THE PLANTS COLLECTED ON THE ISLAND

In the following enumeration there is indicated the place of publication of the first formal report of each species for the island. The species for which no such citation is given are reported for Barro Colorado Island for the first time on the following pages. The meaning of the abbreviations employed for the citations will be obvious by reference to the bibliography on page 159: "Standley, Fl.," THE FLORA OF BARRO COLORADO ISLAND, PANAMA; "Standley, Suppl.," A SECOND SUPPLEMENT TO THE FLORA OF BARRO COLORADO ISLAND, PANAMA; WESTON (Sci. Month.) etc.

ALGAE

DESMIDIACEAE

Mr. Roy M. Whelden of Harvard University has generously contributed the following annotated list, enumerating the desmids collected on Barro Colorado Island by Dr. C. W. Dodge. The writer is deeply appreciative of Mr. Whelden's cooperation in making it possible to include in the present paper the first report upon these plants made for the island. Mr. Whelden states that the available collections include representation of perhaps twenty other species, whose determination awaits further study.

Gonatozygon pilosum Wolle.—Long. cell. 180 μ ; diam. 18 μ .

Netrium digitus (Ehrenb.) Itzigs. & Rothe.

Penium minutum (Ralfs) Cleve.—Long. cell. 160-175 μ ; lat. cell. 8.5-11 μ .—Very abundant and variable in size of cells. Also var. *gracile* Wille.

Pleurotaenium ovatum Nordst. (*Docidium ovatum* Nordst.) —Long. semicell. 196 μ ; lat. 131 μ ; lat. isthm. 70 μ . Membrana punctata.—Common in one collection.

Pleurotaenium trabecula (Ehrenb.) Näg.—Long. cell. 710 μ ; diam. max. 30 μ ; isthm. 26 μ ; diam. apic. 22 μ .—Not common.

Euastrum abruptum Nordst.—Long. cell. 64 μ ; lat. cell. 45 μ ; crass. 28 μ ; isthm. 10 μ .

Euastrum gemmatum Bréb. var.—Long. cell. 75 μ ; lat. cell. 70 μ ; crass. 37 μ ; isthm. 20 μ ; lat. lob. pol. 27 μ ; crass. lob. pol. 20.5 μ .

Micrasterias oscitans Ralfs.—Long. cell. 168 μ ; lat. (max.) 200 μ ; isthm. 26 μ .

Micrasterias laticeps Nordst.—Long. cell. 155 μ ; lat. lob. bas. 197 μ ; lat. lob. pol. 170 μ ; isthm. 28 μ .

Micrasterias radiata Hass.—Long. cell. 160 μ ; lat. cell. 132 μ ; crass. 36 μ ; isthm. 23 μ .

Cosmarium moniliforme (Turp.) Ralfs var. **limneticum** W. & G. S. West.—Long. cell. 42-45 μ ; lat. cell. = crass. cell. 24-26 μ ; isthm. 16-17 μ .—Abundant and in filaments up to 8 cells long.

Cosmarium commissurale Bréb. var. **crassum** Nordst.—Long. cell. = lat. cell. 40 μ ; crass. 25 μ ; isthm. 14 μ ; crass. lob. pol. 16 μ .

Cosmarium lagoense Nordst.

Cosmarium Brebissonii Menegh. var.—Long. cell. 77 μ ; lat. cell. 57 μ ; lat. isthm. 28 μ ; crass. cell. 41 μ .

Cosmarium reniforme (Ralfs) Arch. var.—Long. cell. 49 μ ; lat. cell. 36 μ ; isthm. 15.75 μ ; crass. cell. 27 μ .

Cosmarium logiense Bissett.—Long. cell. 70 μ ; lat. 50 μ ; isthm. 20 μ .

Cosmarium protractum (Näg.) De Bary.—Long. cell. = lat. cell. 52 μ ; lat. lob. pol. 17 μ ; isthm. 11 μ ; crass. 21 μ .

Xanthidium antilopaeum (Bréb.) Kütz. var. **canadense** Josh.—Long. cell. sin. acul. 73 μ ; lat. cell. sin. acul. 68 μ ; lat. isthm. 32 μ ; crass. cell. sin. acul. 48 μ ; long. acul. 38 μ .—Abundant and variable in placement of spines.

Arthrodesmus triangularis Lagerh. f. **triquetra** W. & G. S. West.—Long. sin. acul. 33 μ ; lat. sin. acul. 27 μ ; isthm. 6 μ ; long. acul. 15 μ .

Staurastrum brasiliense Nordst.—Long. sin. acul. 53 μ ; lat. sin. acul. 38 μ ; lat. cum acul. 86 μ ; isthm. 9 μ .—Abundant.

Staurastrum minnesotense Wolle var.—Long. cell. 74 μ ; lat. sin. acul. 62 μ ; isthm. 21 μ ; long. acul. 10 μ . Membrana punctata.

Staurastrum gracile Ralfs.—Long. cell. 50 μ ; lat. cell. cum proc. 90 μ ; lat. isthm. 13 μ .

Staurostrum gracile var. **cyathiforme** W. & G. S. West.—Long. cell. 51 μ ; lat. cum proc. 117 μ ; isthm. 12 μ .

Staurostrum pseudosebaldi Wille var. **unguiculatum** Borge forma (?).—Long. cell. 50 μ ; lat. cell. cum proc. 105 μ ; isthm. 14 μ .

Staurostrum tetracerum Ralfs.—Long. cell. 24 μ ; lat. cum proc. 29 μ ; isthm. 5 μ .—Abundant.

Staurostrum leptocladon Nordst. var. **cornutum** Wille.—Long. semicell. 20 μ ; lat. sine proc. 20 μ ; cum proc. 96 μ ; isthm. 8 μ ; crass. 16 μ .

Staurostrum grallatorium Nordst. var. **americanum** West forma.—Long. cell. 40 μ ; lat. cum proc. 120 μ ; crass. 15 μ ; isthm. 6 μ .

Staurostrum rotula Nordst.—Long. cell. 42-48 μ ; lat. cum proc. 110-118 μ ; lat. sine proc. 28-30 μ ; isthm. 14 μ .

Staurostrum Arctiscon (Ehr.) Lund. var. (?).—Long. sin. proc. 46 μ ; long. cum proc. 92 μ ; lat. cum proc. 92-104 μ ; lat. sin. proc. 31 μ ; isthm. 18-20 μ .—Common, and variable in size.

Cosmocladium pulchellum Bréb.—Long. cell. 10 μ ; lat. 9 μ ; crass. 5 μ .

Spondylosium pulchrum Arch.—Lat. fil. 50 μ ; long. cell. 30-32 μ ; isthm. 18 μ ; junct. 9 μ .

Desmidium Swartzii Ag.—Abundant.

Desmidium Baileyi (Ralfs) Nordst.—Long. cell. 20 μ ; lat. cell. 23 μ .—Common.

RHODOPHYCEAE

Amphibia Moritziana (Sond.) Ktze. — Collected on large rocks in brook bed at Shannon I. by Weston, identified by W. R. Taylor and mentioned in his "Notes on Algae from the Tropical Atlantic Ocean," *Am. Jour. Bot.* 16:620-630 (1929). Growing in close, dense, turfy patches on rocks, covered with rushing torrents during heavy rains and left almost dry during the dry season. Of interest because it represents a rhodophycean genus, typically marine yet found in tropical fresh water streams, and because, although collected repeatedly in February, March and April by Weston and in August (1929) by R. H. Wetmore, it was never found fruiting.

CHARACEAE

Chara Kenoyeri Howe in Field Mus. Pub. Bot. Ser. 4:159. pl. 16 (1929).—The species is known only from Barro Colorado Island, the type having been collected by L. A. Kenoyer in 1927. The plant was found there also by L. H. Bailey in 1931. The plants of this group are brittle submerged aquatic plants with verticillate leaves.

FUNGI

The list of species of Barro Colorado Island published in 1927 was based chiefly upon specimens collected by the writer and determined by Dr. J. R. Weir but included also some records reported by Professor F. L. Stevens and Professor G. R. Bisby. Since then an interesting addition (*Mykossyrinx Cissi*) has come to the attention of the writer. A considerable number of additional fungi were collected by Dr. Wm. H. Weston Jr. in 1929, and some of them have been mentioned or illustrated in his recent paper "The Fungi of Barro Colorado" in the Scientific Monthly for May 1933. As the present list, although still scanty, has been sufficiently augmented to justify grouping the species under the main classes at least, this rearrangement has been made by him. Already these incidental gatherings afford ample evidence that intensive collecting will reveal a rich and varied fungus flora on the island.

MYXOMYCETES

Arcyria cinerea Pers.—Standley (Fl. 6).

In addition the following were collected by Wm. H. Weston Jr. and identified by him and by F. A. Gilbert and A. H. Povah.

Arcyria denudata (L.) Wett.—Weston (Sci. Month.).

Brefeldia maxima Rost.

Dictydium cancellatum (Batsch) Macbr.

Didymium squamulosum (Alb. & Schw.) Fr.—Weston (Sci. Month.).

Fuligo septica (L.) Gmel.

Hemitrichia clavata (Pers.) Rost.—Weston (Sci. Month.).

Hemitrichia serpula (Scop.) Rost.—Weston (Sci. Month.).

Lamproderma arcyryonema Rost.—Weston (Sci. Month.).

Lycogala epidendrum Fr.—Weston (Sci. Month.).

Ceratiomyxa fruticulosa Macbr.—Weston (Sci. Month.).

PHYCOMYCETES

As the Phycomycetes do not lend themselves to casual collections and identification but require intensive study on the spot they do not appear in the usual enumerations from such localities as this. Weston (Sci. Month.) has mentioned in a general way the occurrence of such common genera as *Choanephora*, *Mucor*, *Phycomyces*, *Pilobolus* and *Rhizopus*, and of the new genus *Lymania*, the description of which will be published separately. After further work an enumeration, primarily of the little known aquatic forms, with notes on species of interest, will also be published.

ASCOMYCETES

Bagnisiopsis peribebuyensis (Speg.) Theiss. & Syd.—Standley (Fl. 6). On *Miconia argentea*.

Camillea cyclops Mont.—Standley (Fl. 6).

Camillea Sagraeana (Mont.) B. & C.—Standley (Fl. 6).

Cookeina sulcipes (Berk.) Kuntze.—Standley (Fl. 6).

Cookeina tricholoma (Mont.) Kuntze.—Standley (Fl. 6).

Irenina Shropshiriana Stevens.—Standley (Fl. 6). On *Miconia argentea*.

Meliola Heliconiae Stevens.—Standley (Fl. 6). On *Heliconia* sp.

Meliola Musae (Kunze) Mont. — Standley (Fl. 6). On *Heliconia* sp.

Meliola palmicola Winter.—Standley (Fl. 6).

Meliola Panici Earle.—Standley (Fl. 6). On *Olyra latifolia*.

Meliola peruviana var. *irregularis* Stevens. — Standley (Fl. 6). On an undetermined plant of the Bignoniaceae.

Meliola Pilocarpi Stevens.—Standley (Fl. 6). On *Zanthoxylum* (?).

Xylaria axifera Mont.—Standley (Fl. 7).

Xylaria cubensis Mont.—Standley (Fl. 7).

The following were collected by Wm. H. Weston Jr. and determined by him and by A. H. Povah; a few were collected by James Zetek.

Camillea mucronata Mont.—Weston (Sci. Month.).

Calonectria rigidiuscula (Berk. & Br.) Sacc.—On cacao-pods.

Capnodium Usterii Rehm.

Corallomyces Jatrophae A. Moeller.

Cordyceps sp. — Weston (Sci. Month.). Immature, on beetle.

Dothinidia scabrosa Sydow.—*Chardon, Toro & Zetek*. On *Miconia macrophylla*.

Entonaema mesenterica A. Moeller.—Weston (Sci. Month.).

Meliola Zetekii Stevens.—Type locality, *J. Zetek*. On *Piper paulownifolium*.

Nectria episphaeria Fr.—On *Xylaria* sp.

Nummularia Bulliardii Tul.—*Chardon, Toro & Zetek*. On dead wood.

Ohlevia brasiliensis Starb.

Oomyces monocarpus A. Moeller.—On mites on grass.

Orbilina brasiliensis (Speg.) Sacc.

Phillipsia dominguensis Berk.—Weston (Sci. Month.).

Phyllachora paspalicola P. Henn.—*Chardon, Toro & Zetek*. On *Paspalum conjugatum*.

Stictis bella Kalch. & Cke.

In addition the following Pyrenomycetes were collected by Wm. H. Weston Jr. and determined by J. H. Miller.

Xylaria arbuscula Sacc.

Xylaria Berkeleyi Mont.

Xylaria comosa Mont.—Weston (Sci. Month.).

Xylaria consociata Starb.—Weston (Sci. Month.).

Xylaria fusca Mont.

Xylaria grammica Mont.—Weston (Sci. Month.).

Xylaria ianthino-velutina Mont. — Weston (Sci. Month.). On fruits of *Apeiba aspera*.

Xylaria muscula

Xylaria spp.—Conidial only. Indeterminable.

Hypoxydon Archeri Berk.

Hypoxydon Broomeianum B. & C.—Weston (Sci. Month.).

- Hypoxylon glomeratum** Cke.
Hypoxylon haematostroma Mont.
Hypoxylon hypomiltum Mont.
Hypoxylon Kalchbrenneri Sacc.
Hypoxylon melanaspis Mont.
Hypoxylon Merrillii (Bres.) Mill.—Weston (Sci. Month.).
Hypoxylon Poucearum B. & Cke.
Hypoxylon punctulatum B. & Rav.
Hypoxylon rubiginosum P. ex Fr.
Daldinia concentrica (Bolt.) C. & de N. var. *microspora* Starb.
Kretzschmaria clavus Fr.—Young.
Kretzschmaria gomphoidea Penz. & Sacc.
Penzigia cretacea (B. & Br.) Sacc.
Phylacia poculiformis (Kze.) Mont.—Weston (Sci. Month.).

BASIDIOMYCETES

USTILAGINALES

Mykoxyrinx Cissi (DC.) G. Beck. — Without locality, *Aviles* 59. On inflorescences of *Cissus sicyoides*. The greatly deformed inflorescences often are mistaken for a separate parasitic flowering plant, and they once were made the type of a supposed new genus of phanerogams.

UREDINALES

The following rusts were collected by F. L. Stevens and determined by H. S. Jackson:

Puccinia Emiliae P. Henn.—Standley (Fl. 7).—On *Neuro-laena lobata*.

Uredo Dioscoreae P. Henn.—Standley (Fl. 7). — On *Dioscorea urophylla*.

HYMENOMYCETALES

Auricularia mesenterica Bull.—Standley (Fl. 6). Called like most of the fleshy and woody fungi growing on logs or tree trunks “orejas” or “orejitas.”

Fomes Auberianus Mont.—Standley (Fl. 6).

Fomes ferreus Berk.—Standley (Fl. 6).

Fomes marmoratus Berk.—Standley (Fl. 6).

Ganoderma sp.—Standley (Fl. 6).

- Gloeosporus conchoides* Mont.—Standley (Fl. 6).
Hexagonia tenuis (Hook.) Fries.—Standley (Fl. 6).
Hexagonia variegata Berk.—Standley (Fl. 6).
Hirneola delicata (Fries) Bres.—Standley (Fl. 6).
Hirneola polytricha Mont.—Standley (Fl. 6).
Hymenochaete damaecornis Link & Lev.—Standley (Fl. 6).
Laschia auriscalpium Mont.—Standley (Fl. 6).
Laschia pezizoidea Berk.—Standley (Fl. 6).
Lentinus strigellus Berk.—Standley (Fl. 6).
Lentinus velutinus Fries.—Standley (Fl. 6).
Polyporus brachypus Lev.—Standley (Fl. 6).
Polyporus gracilis Kl.—Standley (Fl. 6).
Polyporus infernalis Berk.—Standley (Fl. 6).
Polyporus licnoides Mont.—Standley (Fl. 6).
Polyporus lignosus Kl.—Standley (Fl. 6).
Polyporus subelegans Murr.—Standley (Fl. 6).
Polyporus virgatus B. & C.—Standley (Fl. 6).
Polystictus arenicolor Berk.—Standley (Fl. 6).
Polystictus crocatus Fries.—Standley (Fl. 6).
Polystictus occidentalis (Kl.) Fries.—Standley (Fl. 6).
Polystictus sanguineus (L.) Fries.—Standley (Fl. 6). One of the common wood-inhabiting fungi of Central America, conspicuous because of its bright red color.
Polystictus Steinheilianus Berk. & Lev.—Standley (Fl. 7).
Polystictus versatilis Berk.—Standley (Fl. 7).
Polystictus versicolor (Dicks.) Fries.—Standley (Fl. 7).
Poria vincta (Berk.) Cke.—Standley (Fl. 7).
Schizophyllum commune (L.) Fries.—Standley (Fl. 7).
Stereum flabellatum Pat.—Standley (Fl. 7).
Stereum glabrescens Berk.?—Standley (Fl. 7).
Stereum papyrinum Mont.—Standley (Fl. 7).
Thelephora pusiola Pat.?—Standley (Fl. 7).
Trametes caperatus Berk.—Standley (Fl. 7).
Trametes cubensis Mont.—Standley (Fl. 7).
Trametes hydroides (Swartz) Fries.—Standley (Fl. 7).
Trametes rigida Berk. & Mont.—Standley (Fl. 7).

GASTEROMYCETALES

- Geaster* sp.—Standley (Fl. 6).

In addition the following Basidiomycetes were collected by

Wm. H. Weston Jr. and identified by him and by A. H. Povah.

Auricularia fusco-succinea (Schw.) Farl.

Auricularia hispidula (Berk.) Farl.

Dictyophora duplicata (Bosc) Ed. Fischer.—Weston (Sci. Month.).

Geaster mirabilis Mont.—Weston (Sci. Month.).

Hypolyssus Montagnei Berk.—Weston (Sci. Month.).

Lachnocladium manaosense P. Henn.

Lentinus nicaraguensis B. & C.

Odontia sp.

Polyporus rugosus Nees.

Polyporus tricholoma Mont.

Stereum aurantiacum (Pers.) Lloyd.

Stereum decolorans (B. & C.) Lloyd.

Also, a recent addition collected by *J. Zetek* and determined by D. Linder as **Amauroderma**, sp.

FUNGI IMPERFECTI

Aspergillus clavatus Desm.

Cephalophora tropica Thaxt.

Diplodia cacaoicola Henn.—On cacao.

Metarrhizium anisopliae Sor.—Weston (Sci. Month.). On cockroach.

Monilia crassa Shear & Dodge.—Weston (Sci. Month.). On scorched stumps in burned clearing.

Oidium sp.—On leaves of *Sechium edule* in laboratory garden.

Rhizomorpha coryneocarpos Kze.

Rhinotrichum Curtisii Berk.—Weston (Sci. Month.).

Stilbella sp.

In addition to the foregoing species collected and identified by Weston, a number of common moulds were observed by him, some of them being mentioned in the Scientific Monthly. Also a few specimens of greater interest which were collected will be described elsewhere, a new species of *Rhinotrichum* by D. H. Linder, a new genus, *Aglacephalum*, by Weston.

LICHENES

The following lichens, unless otherwise indicated, were collected by Otis Shattuck and determined by C. W. Dodge. The

number of these plants occurring on the island must be much greater, but so far little attention has been given them.

Cladonia fimbriata (L.) Fries, var. **Balfourii** (Cromb.) Vainio.—Without locality, *Shattuck* 450.

Coccocarpia pellita (Ach.) Muell. Arg. var. **parmelioides** (Hook.) Muell. Arg.—Lutz Trail, *Shattuck* 570.

Coenogonium Leprieurii (Mont.) Nyl.

Leptogium azureum (Swartz) Mont. — Standley (Fl. 7). Collected by the writer; determined by G. K. Merrill.

Leptogium bullatum (Swartz) Mont. — Lutz Trail, *Shattuck* 572.

Leptogium tremelloides (L. f.) S. F. Gray.

Parmelia Lindmanni Lynge. — Without locality, *Shattuck* 449.

Parmeliella pannosa (Swartz) Muell. Arg.—Lutz Trail, *Shattuck* 571. Sterile, the determination doubtful.

Ramalina Usnea (L.) Howe. — Without locality, *Shattuck* 448.

BRYOPHYTA

HEPATICAЕ

The following species were collected recently by James Zetek and Otis Shattuck. They have been determined by Miss Caroline C. Haynes.

Ceratolejeunea integrifolia Evans.—Without locality, *Shattuck* 568.

Ceratolejeunea Schwaneckeii Steph.

Euosmolejeunea duriuscula (Nees) Evans.—Without locality, *Shattuck* 568 in part.

Frullania gibbosa Nees “or a new species.”—Without locality, *Shattuck* 569.

Harpalejeunea uncinata Steph.—Without locality, *Shattuck* 568 in part.

Leptocolea sp.—On an orange leaf.

Lopholejeunea Sagraeana (Mont.) Schiffn.

Microlejeunea bullata (Tayl.) Evans. — Without locality, *Shattuck* 569 in part.

Microlejeunea laetevirens (Nees & Mont.) Evans.—Without locality, *Shattuck* 569 in part.

Plagiochila asplenioides (L.) Dumort.
Stictolejeunea squamata (Willd.) Schiffn.

MUSCI

Unless otherwise indicated, the mosses have been determined by Edwin B. Bartram.

Bryum coronatum Schwaegr.—Standley (Fl. 7).

Crossomitrium Wallisi C. M.—Standley (Fl. 7).

Hookeriopsis sp.—Collected by Bailey; determined by R. S. Williams.

Lepodipilum polytrichioides (Hedw.) Brid.—Standley (Fl. 7).

Neckeropsis disticha (Hedw.) Fleisch.—Standley (Fl. 7).

Neckeropsis undulata (Palis.) Broth.—Miller Trail, *Starry* 306.

Octoblepharum albidum (L.) Hedw.—Standley (Fl. 7).

Philonotis tenella (C. M.) Besch.—Standley (Suppl. 120).

Pilosium chlorophyllum (Hornsch.) C. M. — Collected by Bailey; determined by R. S. Williams.

Pilotrichella pulchella Schimp.—Zetek Trail, *Starry* 25.

Pilotrichella viridis (C. M.) Jaeg. — Collected by Bailey; determined by R. S. Williams.

Pilotrichum ramosissimum Mitt.—Standley (Fl. 7).

Syrrhopodon incompletus Schwaegr. — Standley (Suppl. 120).

Taxithelium planum (Brid.) Mitt.—Standley (Fl. 7).

Thuidium schistocalyx (C. M.) Mitt.—Standley (Fl. 7).

PTERIDOPHYTA

MARATTIACEAE

Danaea nodosa (L.) J. Sm.—Standley (Fl. 8). A large coarse terrestrial fern of the forest.

HYMENOPHYLLACEAE

Trichomanes diversifrons (Bory) Mett.—Kenoyer & Standley (p. 145). A terrestrial plant, on shaded ravine banks.

Trichomanes Godmani Hook.—Standley (Fl. 8). A small delicate epiphytic fern, like the following species.

Trichomanes Hookeri Presl var.—Without locality, *Wilson* 87; determined by Weatherby.

Trichomanes Kraussii Hook. & Grev.—Standley (Fl. 8).

Trichomanes sphenoides Kunze.—Standley (Fl. 8).

CYATHEACEAE

The number of tree ferns on Barro Colorado has proved to be surprisingly large, since only one was reported in the first list.

Alsophila microdonta Desv.—Kenoyer & Standley (p. 144). Collected by Kenoyer along the shore at the far end of Gross Trail.

Alsophila rostrata (Humb. & Bonpl.) Mart. (*A. blechnoides* [Rich.] Hook.)—Without locality, *Wilson* 85. Determined by Weatherby.

Alsophila tenerifrons Christ.—Kenoyer & Standley (p. 144). According to Kenoyer, probably the largest tree fern of the island, attaining a height of eight meters. Growing in several of the ravines; large specimens on Pearson Trail, 100 yards from the laboratory.

Alsophila trichiata Maxon?—Fairchild Point, *Shattuck* 740. Juvenile leaves only; determined by Maxon.

Hemitelia petiolata Hook.—Standley (Fl. 7). Frequent, and probably the most common tree fern of the island; certainly the one most frequently collected.

POLYPODIACEAE

Acrostichum aureum L.—Standley (Suppl. 120). A coarse, widely distributed tropical fern, growing in shallow water. Leaves pinnate, the fertile ones with only the upper pinnae fertile.

Acrostichum daneaefolium Langsd. & Fisch.—Kenoyer & Standley (p. 144). Similar in appearance to the preceding, and of the same habitat; fertile leaves with all the pinnae fertile.

Adiantum Killipii Maxon & Weatherby in Amer. Jour. Bot. 19:166 (1932).—The following collections from Barro Colorado are cited with the description: *Standley* 31330; *Kenoyer* 53; *Wetmore & Woodworth* 120.

Adiantum lucidum Swartz.—Standley (Fl. 8). This is a terrestrial fern, like the other species of the genus.

Adiantum obliquum Willd.—Kenoyer & Standley (p. 144).

Adiantum petiolatum Desv.—Kenoyer & Standley (p. 144).

A frequent forest species.

Adiantum philippense L.—Standley (Fl. 8).

Adiantum pulverulentum L.—Without locality, *Wilson* 120.

Determined by Weatherby.

Adiantum villosum L.—Kenoyer & Standley (p. 144). Common in forest.

Ananthacorus angustifolius (Swartz) Underw. & Maxon.—Standley (Fl. 8). An epiphytic plant with narrow entire leaves.

Anetium citrifolium (L.) Splitg. — Standley (Fl. 8). An epiphytic fern with entire flabby leaves.

Asplenium auritum Swartz.—Standley (Suppl. 120).

Asplenium falcinellum Maxon.—Standley (Suppl. 120).

Asplenium laetum Swartz.—Kenoyer & Standley (p. 144).

A terrestrial plant, growing in ravines.

Asplenium pteropus Kaulf.—Standley (Suppl. 120).

Asplenium serratum L.—Standley (Fl. 8). The American birds-nest fern; an epiphyte with often a large cluster of long entire leaves.

Blechnum occidentale L.—Kenoyer & Standley (p. 144). On clay banks.

Blechnum serrulatum Rich.—Standley (Suppl. 120).

Cyclopeltis semicordata (Swartz) J. Sm.—Standley (Fl. 8). One of the most abundant ferns of the island; a coarse terrestrial plant with pinnate leaves.

Dennstaedtia rubiginosa (Kaulf.) Moore. — Kenoyer & Standley (p. 144). A large fern of ravines.

Dictyoxiphium panamense Hook.—Standley (Fl. 8). Terrestrial.

Diplazium delitescens Maxon.—Standley (Fl. 8). A common terrestrial plant with pinnate leaves, suggesting an *Asplenium*.

Diplazium grandifolium Swartz.—Standley (Fl. 8).

Dryopteris ampla (Humb. & Bonpl.) Kuntze.—Collected by Bailey; determined by Maxon; without precise locality, *Wilson* 157; determined by Weatherby.

Dryopteris dentata (Forsk.) C. Chr.—Standley (Fl. 8).

Dryopteris gongylodes (Schk.) Kuntze.—Kenoyer & Standley (p. 144). Frequent in marshes along the shore.

Dryopteris nicaraguensis (Fourn.) C. Chr. — Standley (Suppl. 120).

Dryopteris Poiteana (Bory) Urban.—Standley (Fl. 8). A frequent forest fern.

Dryopteris serrata (Cav.) C. Chr.—Kenoyer & Standley (p. 144). Frequent in marshes along the lake shore.

Dryopteris sordida Maxon.—Kenoyer & Standley (p. 144). A large fern of ravines.

Dryopteris Sprengelii (Kaulf.) Kuntze.—Kenoyer & Standley (p. 144). A large ravine fern.

Elaphoglossum Hayesii (Mett.) Maxon.—Dock, *Shattuck* 593; determined by Maxon. Epiphytic.

Elaphoglossum Herminieri (Bory & Fée) Moore.—Standley (Fl. 8). Epiphytic.

Eschatogramme furcata (L.) Trev.—Standley (Fl. 8). A small epiphyte with forking leaves; often growing on slender branches of shrubs or small trees.

Hemidictyum marginatum (L.) Presl.—Kenoyer & Standley (p. 144). A tall coarse fern with pinnate leaves, growing in ravines.

Leptochilus cladorrhizans (Spreng.) Maxon.—Standley (Fl. 8). A common terrestrial fern of the forest.

Leptochilus nicotianaefolius (Swartz) C. Chr.—Kenoyer & Standley (p. 144). A coarse terrestrial plant.

Maxonia apiifolia (Swartz) C. Chr.—Kenoyer & Standley (p. 145). Terrestrial or epiphytic; rhizome trailing, covered with brown scales.

Nephrolepis biserrata (Swartz) Schott.—Kenoyer & Standley (p. 145). Abundant in marshes.

Nephrolepis pendula (Raddi) J. Sm.—Standley (Fl. 8). An epiphyte with long narrow pinnate leaves.

Pityrogramma calomelanos (L.) Link. — Standley (Fl. 8). A weedy terrestrial fern of open places; immediately recognizable by the whitish under surface of the leaves.

Polybotrya caudata Kunze.—Standley (Fl. 8). A creeping and climbing epiphyte.

Polybotrya osmundacea Humb. & Bonpl.—Standley (Fl. 8). A large climbing epiphyte.

Polybotrya villosula Christ.—Kenoyer & Standley (p. 145). A trailing epiphyte with large bipinnate leaves; growing chiefly on tree ferns.

Polypodium brasiliense Poir.—Dock, *Shattuck* 382. Determined by Maxon.

Polypodium ciliatum Willd.—Standley (Fl. 8). A small epiphyte.

Polypodium costaricense Christ.—Kenoyer & Standley (p. 145). A frequent epiphyte.

Polypodium crassifolium L.—Standley (Fl. 8). A coarse epiphyte with narrow entire fleshy leaves.

Polypodium lycopodioides L.—Wheeler Trail, *Shattuck* 231. A small creeping epiphyte.

Polypodium occultum Christ.—Standley (Fl. 8). Epiphytic.

Polypodium pectinatum L.—Standley (Fl. 8). An epiphyte with pinnate leaves that coil when dried.

Polypodium percussum Cav.—Standley (Fl. 8). Epiphytic.

Polypodium Phyllitidis L.—Kenoyer & Standley (p. 145). A coarse epiphyte; common.

Polypodium tectum Kaulf. — Collected by Bailey; determined by Maxon.

Polypodium truncatulum Rosenst. — Collected by Bailey; determined by Maxon.

Pteris altissima Poir.—Collected by Bailey; determined by Maxon.

Pteris grandifolia L.—Kenoyer & Standley (p. 145). A coarse fern of ravines, the pinnate leaves sometimes four meters long.

Pteris Kunzeana Agardh.—Kenoyer & Standley (p. 145). Growing in ravines.

Pteris propinqua Agardh.—Kenoyer & Standley (p. 145).

Pteris pungens Willd.—Kenoyer & Standley (p. 145).

Saccoloma elegans Kaulf.—Standley (Fl. 8). A common terrestrial plant.

Stenochlaena vestita (Fourn.) Underw.—Standley (Fl. 8). A large creeping epiphyte; common.

Tectaria euryloba (Christ) Maxon.—Standley (Fl. 8).

Tectaria martinicensis (Spreng.) Copel.—Standley (Fl. 8). A common terrestrial plant with thin leaves.

Vittaria lineata (L.) J. E. Sm.—Standley (Fl. 8). Epiphytic, the narrowly linear, thick leaves pendent in dense tufts.

PARKERIACEAE

Ceratopteris pteridoides (Hook.) Hieron.—Drayton Trail, *Shattuck* 606. This curious fern, occasional in ditches and pools about the Zone, may be recognized at once by the fact that the rather large plants float free on the surface of the water.

GLEICHENIACEAE

Dicranopteris flexuosa (Schr.) Underw. — Kenoyer & Standley (p. 144). A coarse, tough vine, forming tangles along exposed shores; noted at the end of Gross Trail and on Orchid Island.

Dicranopteris pectinata (Willd.) Underw.—Dock, *Shattuck* 296; without locality, *Bailey*; determined by Maxon.

SCHIZAEACEAE

Lygodium polymorphum (Cav.) HBK.—Standley (Fl. 7). A slender, very hairy vine, growing in thickets or open places.

Lygodium radiatum Prantl.—Standley (Fl. 8). Common in forest; plants almost glabrous.

SALVINIACEAE

Salvinia auriculata Aubl.—Standley (Fl. 8). A small disk-like plant, floating on quiet water, and often forming sheets over its surface. This and related species are grown commonly as aquarium plants in the United States.

LYCOPODIACEAE

Lycopodium cernuum L.—Standley (Fl. 9). A terrestrial plant, usually on open banks. Widely dispersed in tropical regions.

Lycopodium dichotomum Jacq.—Kenoyer & Standley (p. 145). Epiphytic.

SELAGINELLACEAE

Selaginella conduplicata Spreng.—Standley (Fl. 9). Common in forest.

Selaginella Fendleri Baker.—Standley (Fl. 9).

Selaginella haematodes (Kunze) Spring.—Standley (Fl. 9). Common; conspicuous because of its slender, dark red stems.

Selaginella Schrammii Hieron.—Standley (Fl. 9).

Selaginella sylvatica Baker.—Standley (Fl. 9).

SPERMATOPHYTA

TYPHACEAE

Typha angustifolia L. CAT-TAIL.—Standley (Fl. 9). In shallow water about the shores of the island. A plant widely distributed in tropical and subtropical regions of the earth.

ALISMACEAE

Sagittaria lancifolia L. — Kenoyer & Standley (p. 145). Frequent in marshes along the shore; an acaulescent plant with lanceolate leaves and racemes of delicate white flowers.

HYDROCHARITACEAE

Hydrocleys nymphoides (Humb. & Bonpl.) Buchen.?—Barbour Point, *Shattuck* 401. The collection consists of small sterile plants referable to this family but of uncertain generic and specific position. Further material is necessary to determine their status. The family has not been recorded as yet from the Canal Zone.

GRAMINEAE

Andropogon bicornis L.—Kenoyer & Standley (p. 145). Common in clearings and in marshes off the shore.

Andropogon brevifolius Swartz. — Kenoyer & Standley (p. 145). Orchid Island.

Andropogon condensatus HBK.—Standley (Fl. 9). In clearings.

Andropogon glomeratus (Walt.) BSP.—Kenoyer & Standley (p. 145). A tall, coarse grass growing in the laboratory clearing.

Anthephora hermaphrodita (L.) Kuntze. — Pearson Trail, *Shattuck* 418. A weedy plant.

Arthrostylidium racemiflorum Steud.—Standley (Fl. 9). A slender bamboo, common in forest.

Axonopus compressus (Swartz) Beauv. CARPET-GRASS. — Standley (Fl. 9). Common.

Cenchrus viridis Spreng. SANDBUR.—Standley (Fl. 9). Open places.

Chloris radiata (L.) Swartz.—Standley (Fl. 9). Clearings, rare.

Chloris virgata Swartz. — Kenoyer & Standley (p. 145). Laboratory clearing.

Chusquea simpliciflora Munro.—Standley (Fl. 9). A slender bamboo, common in the forest.

Cynodon Dactylon (L.) Pers. BERMUDA-GRASS. — Standley (Fl. 9). Growing in open places; introduced. Much used as a lawn grass in Central America.

Digitaria horizontalis Willd.—Laboratory clearing, *Shattuck* 356.

Digitaria sanguinalis (L.) Scop. CRABGRASS. — Standley (Fl. 9).

Eleusine indica (L.) Gaertn.—Standley (Fl. 9). A weedy grass of open places.

Eriochloa punctata (L.) Desv.—Dock, *Shattuck* 323. The species is new for the Canal Zone flora.

Gynerium sagittatum (Aubl.) Beauv. CANE. — Standley (Fl. 9). A giant grass of wet places. The hard bamboo-like stems are used in huge quantities in Central America for construction purposes. In favorable places the grass forms dense thickets or canebrakes.

Homolepis aturensis (HBK.) Chase.—Laboratory clearing, *Shattuck* 276.

Hymenachne amplexicaulis (Rudge) Nees.—Standley (Fl. 9). Growing usually in shallow water.

Ichnanthus nemorosus Doell.—Standley (Fl. 9). Common.

Ichnanthus pallens (Swartz) Munro. — Standley (Fl. 9). Common.

Ichnanthus tenuis (Presl) Hitchc. & Chase. — Kenoyer & Standley (p. 145).

Isachne polygonoides (Lam.) Doell.—Kenoyer & Standley (p. 145). A low grass of wet soil.

Ischaemum rugosum Salisb.—Standley (Fl. 9). In clearings.

Lasiacis divaricata (L.) Hitchc.—Collected by Bailey; determined by Hitchcock.

Lasiacis procerrima (Hack.) Hitchc. — Without locality, *Aviles* 111. This species is a tall coarse erect plant with large open panicles and long broad leaves. All the other species are slender vines with small panicles and short leaves.

Lasiacis ruscifolia (HBK.) Hitchc.—Without locality, *Shattuck* 528.

Lasiacis sorghoidea (Desv.) Hitchc. & Chase. — Standley (Fl. 9). Common in thickets and forest.

Leersia hexandra Swartz.—Kenoyer & Standley (p. 146). Frequent in wet soil.

Leptochloa virgata (L.) Beauv.—Kenoyer & Standley (p. 146). Frequent in clearings.

Olyra latifolia L.—Standley (Fl. 9). Common in forest. A tall coarse grass with broad leaves.

Oplismenus Burmanni (Retz.) Beauv.—Standley (Fl. 9). Very common. One of the most abundant small weedy grasses of Central America.

Oplismenus hirtellus (L.) Beauv.—Standley (Fl. 9). Common.

Orthoclada laxa (Rich.) Beauv. — Standley (Fl. 9). In forest.

Oryza latifolia Desv.—Dock, *Shattuck* 325. A native plant, closely similar to cultivated rice.

Oryza sativa L. RICE; ARROZ.—Standley (Fl. 9). Upland rice has been under cultivation on the island.

Panicum barbinode Trin. PARA-GRASS; HIERBA DE PARÁ.—Kenoyer & Standley (p. 146). Growing abundantly in the edge of the lake, and sometimes aiding in the formation of floating islands.

Panicum fasciculatum Swartz. — Kenoyer & Standley (p. 146). In clearings.

Panicum geminatum Forsk.—Kenoyer & Standley (p. 146). Marshes.

Panicum grande Hitchc. & Chase.—Barbour Point, *Shattuck* 405. A large coarse grass growing in shallow water or wet soil.

Panicum maximum Jacq. GUINEA-GRASS; GUINEA.—Laboratory clearing, *Shattuck* 65. Also collected by Bailey; determined by Hitchcock. This tall coarse grass that forms dense clumps is the most common and useful forage grass of Central America. It has been planted extensively in the region of the Canal Zone for pasture.

Panicum megiston Schult.—Kenoyer & Standley (p. 146). In marshes.

Panicum pilosum Swartz.—Standley (Fl. 9). Clearings.

Panicum trichoides Swartz.—Standley (Fl. 9). Common; one of the most abundant weedy grasses of tropical America, rather handsome because of its neat foliage and diffuse panicles of minute spikelets.

Panicum zizanioides HBK.—Kenoyer & Standley (p. 146). Marsh near Termite House.

Paspalum conjugatum Berg.—Standley (Fl. 9). A common weedy species, with long slender rooting stems.

Paspalum decumbens Swartz. — Kenoyer & Standley (p. 146). A prostrate grass in forest.

Paspalum microstachyum Presl. — Without locality, *Shattuck* 465.

Paspalum paniculatum L.—Standley (Fl. 9). Clearings; a coarse plant, forming large clumps.

Paspalum repens Berg.—Barbour Point, *Shattuck* 403. A rather coarse, aquatic plant.

Paspalum saccharoides (Swartz) Nees.—Kenoyer & Standley (p. 146).

Pharus glaber HBK. — Standley (Fl. 9). Frequent in forest; a coarse plant with exceptionally broad leaves.

Pharus latifolius L.—Standley (Fl. 9). Frequent.

Phragmites communis Trin. REED.—Kenoyer & Standley (p. 146). A tall, coarse grass growing in shallow water. One of the most widely distributed grasses of the world.

Polytrias amaurea (Büse) Kuntze. — Standley (Fl. 9). Laboratory clearing; an East Indian grass, planted for lawns about the Isthmus, and often escaping.

Saccharum officinarum L. SUGAR CANE; CAÑA.—Standley (Fl. 10). Planted at the laboratory, and persisting about some of the old clearings. Native in the Old World tropics.

Sacciolepis Myuros (Lam.) Chase.—Collected by Bailey; determined by Hitchcock. A slender, nearly glabrous annual with spike-like panicles; growing in wet soil.

Setaria geniculata (Lam.) Beauv. FOXTAIL.—Standley (Fl. 10). Common in open places; one of the most abundant weeds of Central America.

Setaria paniculifera (Steud.) Fourn.—Kenoyer & Standley (p. 146). Orchid Island.

Setaria vulpiseta (Lam.) R. & S.—Standley (Fl. 10). In clearings.

Sporobolus indicus (L.) R. Br.—Kenoyer & Standley (p. 146). Clearing at Barbour Navigation Signal.

Streptochaeta Sodiroides Hack. HITCHCOCK-GRASS.—Standley (Fl. 10). A tall coarse plant of the forest; the long awns are twisted together and remain attached at the top of the inflorescence. The handsome leaves are 6-8 cm. wide.

Streptogyne crinita Beauv.—Standley (Fl. 10). Occasional in forest.

Zea Mays L. MAIZE; MAÍZ.—Standley (Fl. 10). Planted at the laboratory.

CYPERACEAE

Cyperus caracasanus Kunth. JUNCO. — Standley (Fl. 10). Open places.

Cyperus diffusus Vahl.—Dock, *Shattuck* 321. One of the most common of tropical American sedges; it is remarkable that it has not been found more often on Barro Colorado.

Cyperus ferax Rich. JUNCO. — Standley (Fl. 10). Occasional in clearings. One of the most abundant and widely dispersed weeds of the American tropics.

Cyperus giganteus Vahl.—Standley (Fl. 10). In shallow water along the edge of the lake; a giant sedge, much like the *Papyrus* of the Nile.

Cyperus Luzulae (L.) Retz.—Kenoyer & Standley (p. 146). Marshes near the laboratory landing.

Cyperus rotundus L.—Kenoyer & Standley (p. 146). Common in clearings.

Cyperus simplex HBK. — Kenoyer & Standley (p. 146). Frequent in clearings and along trails. Similar to *C. diffusus*, but in that the umbels are long-pedunculate; in *C. simplex*, the peduncles are much shorter than the umbels.

Dichromena radicans Schlecht. & Cham. CLAVO.—Standley (Fl. 10). Open places. A small sedge with heads of whitish spikelets.

Eleocharis caribaea (Rottb.) Blake.—Dock, *Shattuck* 353. Stems slender, leafless, bearing a single minute spikelet.

Eleocharis variegata Presl var. *laxiflora* (Thwaites) Ridley.—Kenoyer & Standley (p. 146). In marshes.

Fimbristylis diphylla (Retz.) Vahl.—Standley (Fl. 10). In clearings. A weedy plant.

Fuirena robusta Kunth.—In water, cove south of French Lock site, *Woodworth & Vestal* 464. Leaves 1.5-2 cm. wide.

Fuirena umbellata Rottb.—Standley (Fl. 10). In shallow water at the edge of the lake. Leaves mostly less than 1.5 cm. wide.

Hypolytrum nicaraguense Liebm. — Zetek Trail, *Shattuck* 307. A coarse sedge, often a meter high, with broad leaves.

Kyllinga pumila Mich.—Standley (Fl. 10). Occasional in open places.

Mariscus jamaicensis (Crantz) Britton. SAW-GRASS.—Standley (Fl. 10). Common in shallow water at the edge of the lake. Leaves thick and tough, with sawlike margins that cut the flesh painfully.

Rynchospora cephalotes (L.) Vahl. PAJA MACHO DE MONTE ("TAPIR-GRASS").—Standley (Fl. 10). Open places, forming dense clumps; spikelets in dense rounded heads.

Rynchospora corymbosa (L.) Britton.—Kenoyer & Standley (p. 146). Shores along the lake; a large coarse plant, the spikelets in open panicles.

Rynchospora micrantha Vahl. — Kenoyer & Standley (p. 146). A low annual with open inflorescence and minute spikelets.

Scirpus cubensis Kunth.—Kenoyer & Standley (p. 146). Marshes about the lake shore.

Scleria bracteata Cav. CORTADERA, CUCHILLITO.—Standley (Fl. 10). A coarse plant, often climbing to a height of several feet. The sharp edges of the narrow leaves cut the flesh like a knife.

Scleria melaleuca Schlecht. & Cham.—Standley (Fl. 10). Frequent in shaded places. Recognized by its small smooth purple achenes.

Scleria mitis Berg.—Kenoyer & Standley (p. 146). Abundant in clearings.

Scleria paludosa Kunth. — Kenoyer & Standley (p. 146). In marshes; a tall coarse plant.

Scleria secans (L.) Urban.—Miller Trail, rear light, *Shattuck* 580.

PALMAE

The palms of Barro Colorado Island and of other parts of the Canal Zone have been described and illustrated recently

in great detail by L. H. Bailey, in an admirable paper entitled "Certain palms of Panama" (*Gentes Herbarum*, 3:32-116, fig. 20-88. 1933). With Dr. Bailey's paper before him, the visitor will have no difficulty in placing all the palms native in the region.

***Acanthorrhiza Warscewiczii* Wendl.** NOLÍ, PALMA DE ESCOBA.—Standley (Fl. 10). Frequent in forest. A tall tree with densely spiny trunk. Easily recognized by the leaves, since it is the only fan palm of the region. The leaves are employed for thatching and for making coarse brooms, and the brown wool at the base of the petioles for stuffing pillows and cushions.

***Astrocaryum Standleyanum* Bailey,** *Gentes Herb.* 3:88 (1933). BLACK PALM; CHUNGA, CHONTA. Reported previously as *A. polystachyum* Wendl.—Standley (Fl. 10). A tall forest palm with densely spiny trunk. The extremely hard and intensely black wood is used for making walking sticks that are offered to tourists, and it has been suggested as suitable for the manufacture of golf clubs and umbrella handles. The name "chonta," probably of South American origin, is applied in southern Central America and far southward along the Andes to a great number of spiny-stemmed palms.

***Bactris balanoidea* Wendl.** — Bailey, *Gentes Herb.* 3:97 (1933).—Bailey reports one clump from the vicinity of Fairchild Point. The species ranges northward to Guatemala.

***Bactris barronis* Bailey,** *Gentes Herb.* 3:101 (1933).—A small caespitose palm, growing in woods. Reported only from the island.

***Bactris coloniata* Bailey,** *Gentes Herb.* 3:106 (1933). UVITO.—A low, slender, densely spiny palm, forming open colonies; reported by Bailey as the most abundant palm of Barro Colorado, and recorded from no other locality, although doubtless it occurs elsewhere in the region. Like other species of the genus, this is a pest, perniciously offensive because of its abundance of sharp, slender, needlelike spines.

***Bactris coloradonis* Bailey,** *Gentes Herb.* 3:104 (1933).—A slender palm as much as 7.5 meters high, with smooth, orange or red-orange fruit. Reported only from the island.

Bactris superior Bailey, Gentes Herb. 3:99 (1933). LATA, PALMA BRAVA, CAÑA BRAVA. Probably the palm listed from the island as *Pyrenoglyphis major* (Jacq.) Karst.—Standl. Fl. 10. A tall spiny palm, the trunk as much as 15 meters high. Reported by Bailey only from Barro Colorado, but no doubt occurring widely in the region of the isthmus.

In addition to the *Bactris* species listed, Bailey reports three other forms from the island, but since they are imperfectly known, they are left for the present without specific names.

Chamaedorea Wendlandiana (Oerst.) Hemsl. CAÑA VERDE, BOLÁ.—Standley (Fl. 10). Abundant in forest. A small, slender, unarmed palm of graceful habit, conspicuous because of its orange-red fruits. It is noteworthy that this genus of palms, with probably more species than any other Central American group, is represented on the isthmus by a single species. In other regions near the coast at least two and often several species may be found within a limited area.

Cocos nucifera L. COCOANUT, COCO.—There are a few trees about the sites of former dwellings.

Corozo oleifera (HBK.) Bailey, Gentes Herb. 3:59 (1933). COROZO COLORADO, COROCITO.—Pl. VI B.—Reported heretofore from the Canal Zone as *Elaeis melanococca* Gaertn., a name referable properly to the African oil palm, *Elaeis guineensis*. Reported by Bailey as occurring at several places along the shore of Barro Colorado Island. Formerly, at least, oil extracted from the seeds of this palm in Panama was employed for illumination and other purposes. Bailey's suggestion that the name Corozo Palm be reserved for this species may serve for book usage, but the fact remains that the term Corozo is applied over a wide area to various kinds of palms, and in Central America it usually signifies one of the tall plants of the genera *Scheelea* and *Orbignya*.

Desmoncus chinantlensis Liebm. MATAMBA.—Bailey, Gentes Herb. 3:90 (1933).—Reported from the Canal Zone heretofore as *D. polyacanthos* Mart. The only climbing palm of the region, occurring in forest. Recognizable by the leaves, with whiplike tips in which the pinnae are replaced by stout awl-like reflexed spines. The plant is a troublesome and even

dangerous one, the leaf hooks tearing clothing and inflicting severe and painful wounds in the flesh.

Geonoma binervia Oerst. — Bailey, Gentes Herb. 3:78 (1933).—Occasional in forest, the species extending northward to Guatemala.

Geonoma decurrens Wendl. RABO AHORCADO. — Bailey, Gentes Herb. 3:77 (1933).—Reported previously as *Asteroogyne* sp. (Standley, Fl. 10). Frequent in forest. A low plant, often stemless, the mostly simple leaves deeply bilobed at the apex.

Geonoma procumbens Wendl.—Bailey, Gentes Herb. 3:75 (1933). Reported previously as *Calyptrogyne* sp. (Standley, Fl. 10). In ravines and forest. A small, slender, usually stemless palm, with a simple inflorescence.

Oenocarpus panamanus Bailey, Gentes Herb. 3:71 (1933). MAQUENQUE.—Frequent in forest. A tall slender palm, as much as 20 meters high, with smooth trunk. It grows plentifully also in other parts of the Canal Zone. It may be noted that in describing this species, as well as in the case of most others named from the Canal Zone, the author has indicated no types, nor, for that matter, even a certain type locality. In view of the haphazard manner in which many palms have been described heretofore, this is perhaps less remarkable than it would be in some other groups of plants; but in view of the confusion that often has resulted from such practice, instances of which are mentioned in this very paper upon Panama palms, it is unfortunate that the modern custom of indicating type specimens was not followed. It is conceivable that later students may find occasion to modify the conclusions reached by the author of the latest account of the palms of the Canal Zone.

Scheelea zonensis Bailey, Gentes Herb. 3:36 (1933). COHUNE, COROZO. Reported previously as *Attalea gomphococca* Mart.—Kenoyer & Standl. (p. 146). Occasional in forest; the largest palm of the isthmus. For this species the type locality is stated definitely to be Barro Colorado Island. The large fruits are rich in oil.

Socratea durissima (Oerst.) Wendl. STILT PALM; JIRA.—Pl. VI A.—Bailey, Gentes Herb. 3:69 (1933). Reported pre-

viously as *Iriarteia exorrhiza* Mart.—Standl. (Fl. 10). Frequent in forest. A strikingly beautiful palm, easily recognized by the large, hard, rough, prop roots that support the base of the tall, smooth trunk.

Synechanthus Warscewiczianus Wendl. PALMILLA, BOLÁ.—Standl. (Fl. 10). Frequent in forest. A slender small palm, suggestive of a *Chamaedorea*, distinguished by the much-branched, broomlike inflorescence.

CYCLANTHACEAE

Carludovica palmata Ruiz & Pavón. PANAMA HAT PALM; PORTORRICO, JIPIJAPA, RAMPIRA, IRACA.—Standley (Fl. 11). Frequent in forest. A stemless plant with numerous, long-stalked leaves, the large blades cleft so as to suggest a Maltese cross. From the fiber of young leaves of this plant the celebrated "Panama" hats are woven in Ecuador.

Cyclanthus bipartitus Poit. PORTORRICO.—Standley (Fl. 11). A stemless plant, the leaves cleft to the base into two broad divisions. Easily recognized by the dry fruit, which resembles a large screw. Frequent in forest.

ARACEAE

In the writer's Flora of the Panama Canal Zone there are reported 47 species of this family. On Barro Colorado Island there have been collected 36 of these, besides four species not recorded in the Flora.

Anepsias Moritzianus Schott.—Standley (Fl. 11). A long vine with very large, oblong-ovate leaves, rounded at the base.

Anthurium acutangulum Engler.—Kenoyer & Standley (p. 147). A large epiphyte with lance-ovate, somewhat leathery leaves, acute at the base.

Anthurium aemulum Schott.—Standley (Fl. 11). A coarse epiphytic vine, the pedately parted leaves with entire segments.

Anthurium crassinervium (Jacq.) Schott.—Without locality, *Bailey* 72. A handsome epiphytic plant having a large cluster of broad obovate leaves as much as 120 cm. long; fruiting spikes red, long and heavy, pendent below the leaves.

Anthurium denudatum Engler. — Marsh near Drayton House, *Woodworth & Vestal* 567; edge of Lake, *Starry* 232. Leaves coriaceous, sagittate, deeply cordate at the base.

Anthurium Friedrichsthali Schott. — Standley (Fl. 11). A small acaulescent epiphyte with rather thin, linear leaves 1.5-2.5 cm. wide.

Anthurium Holtonianum Schott. — Standley (Fl. 11). A handsome and showy plant, climbing high on trees; leaves huge, digitately parted, the segments lobed or undulate.

Anthurium linearifolium Engler. — Kenoyer & Standley (p. 147). Frequent; leaves oblong-linear, thick and leathery.

Anthurium littorale Engler.—On dead stumps, shore east of Peña Blanca, *Woodworth & Vestal* 680. A stemless epiphyte with oblong-elliptic, rather thin leaves.

Anthurium maximum (Desf.) Engler.—Standley (Fl. 11). Similar to *A. crassinervium*.

Anthurium myosuroides (HBK.) Endl. — Armour Trail, *Starry* 60; without locality, *Bailey* 517, 625. An epiphyte with long slender climbing stems; leaves thin, oblong-elliptic, narrowly cordate at the base. The species has not been reported from the Canal Zone.

Anthurium rigidulum Schott? — Kenoyer & Standley (p. 147). An epiphyte on a stump in the lake; collected by Kenoyer.

Anthurium Schlechtendalii Kunth.—Standley (Fl. 11). An acaulescent epiphyte with large broad leaves, acute at the base.

Anthurium scolopendrinum (Ham.) Kunth.—Standley (Fl. 11). Plants acaulescent, with thin, narrowly oblanceolate leaves.

Anthurium tetragonum (Hook.) Schott.—Zetek Trail, *Shattuck* 638. Similar to *A. crassinervium*.

Anthurium triangulum Engler.—Standley (Fl. 11). Similar to *A. denudatum*, but with much thinner leaves.

Anthurium undatum Schott? — Wheeler Trail, *Shattuck* 225. A coarse vine with pedately parted leaves having thin entire segments; fruit spikes orange or scarlet. The plant is new to North America, but there is some uncertainty regarding the specific determination.

Dieffenbachia aurantiaca Engler.—Without locality, *Bailey* 335. Growing in shallow water; leaves cordate at the base; spathe yellow.

Dieffenbachia Oerstedii Schott. OTÓ DE LAGARTO. — Standley (Fl. 11). Called "dumb cane" by the West Indians. A coarse terrestrial herb with thick erect stems, the oblong-ovate leaves rounded at the base. The crushed plant has an unpleasant skunklike odor. The sap is irritant in contact with the skin, and care must be exercised in handling the plant. Dieffenbachias sometimes are cultivated in hothouses in the United States. Their popular name of "mother-in-law plant" alludes to the fact that when a piece of the leaf is chewed, the needlelike crystals puncture the tongue, causing it to swell considerably, and making speech difficult. The same result may be obtained by chewing a small piece of the leaf of almost any other plant of the family.

Monstera dilacerata Koch.—Standley (Fl. 11). A large epiphytic vine; leaves broad, deeply pinnatifid.

Monstera pertusa (L.) de Vriese.—Standley (Fl. 11). A coarse vine, to be recognized at once by the broad leaves perforated with numerous large holes.

Monstera Pittieri Engler.—Without locality, *Aviles* 91; *Starry* 17; Lutz Trail, *Shattuck* 6; Snyder-Molino Trail, *Shattuck* 27. An epiphytic vine, the leaves entire and small for the genus. All the specimens received are sterile, but they appear referable to this Costa Rican species, which has not been recorded for the Canal Zone.

Montrichardia arborescens (L.) Schott.—Kenoyer & Standley (p. 147). Frequent in lake shore marshes. A tall shrub-like plant with prop roots, somewhat suggestive of the cultivated *Calla*, especially because of the broad white spathes and sagittate leaves.

Philodendron coerulescens Engler.—Standley (Fl. 11). An epiphytic vine with ovate, entire leaves.

Philodendron grandipes Krause.—Standley (Fl. 11). Common. Plants acaulescent, terrestrial, with large rounded-cordate leaves.

Philodendron Karstenianum Schott. — Standley (Fl. 11). An epiphyte, the oblong leaves obtuse at the base.

Philodendron oxycardium Schott? — Wheeler Trail, *Shattuck* 215. A coarse epiphytic vine with broad, entire, somewhat cordate leaves. The specimens are sterile and the deter-

mination uncertain, but the species represented is one that is new to the Canal Zone.

Philodendron panamense Krause.—Kenoyer & Standley (p. 147). An epiphytic vine with cordate leaves.

Philodendron radiatum Schott. AZOTA CABEZA, CHALDÉ.—Standley (Fl. 11). A handsome coarse vine, the large thick leaves deeply pinnatifid into narrow segments. One of the common plants of the family in many parts of Central America.

Philodendron rigidifolium Krause. CINCHADORA.—Standley (Fl. 11). An epiphyte with broadly ovate leaves.

Philodendron tripartitum (Jacq.) Schott. — Standley (Fl. 11). Common. A coarse vine, easy of recognition by the leaves, parted into three oblong entire segments.

Philodendron Wendlandii Schott.—Standley (Fl. 11). An epiphytic vine, the oblong leaves cordate at the base.

Pistia Stratiotes L. WATER LETTUCE.—Standley (Fl. 11). Floating in quiet water. Quite unlike other members of the family, the plant consisting of a rosette of broadly wedge-shaped, spongy, pale green leaves, with minute inflorescences.

Spathiphyllum Friedrichsthali Schott.—Zetek Trail, *Starry* 27; Snyder-Molino Trail, *Starry* 4; without locality, *Starry* 48; Miller rear light, *Shattuck* 581. A terrestrial, acaulescent plant with thin, green, acuminate leaves; spadix subtended by a large, whitish, flat spathe. In this species the fruiting spikes appear tuberculate because of the elongate styles; in *S. Patini* the spikes are not tuberculate.

Spathiphyllum Patini (Hogg) N. E. Brown.—Standley (Fl. 11). Frequent in forest. In Salvador, the inflorescences of plants of this genus are cooked with eggs and eaten.

Stenospermation sessile Engler. — Standley (Fl. 11). A large epiphytic vine with lance-oblong leaves 15-18 cm. long.

Syngonium podophyllum Schott. AZOTA CABEZA. — Shore north of Bangs House, *Woodworth & Vestal* 585. A large vine; leaves cleft into 5 or 7 segments; spathes 10 cm. long, green.

Xanthosoma helleborifolium (Jacq.) Schott. PAPAYUELO.—Standley (Fl. 12). A terrestrial plant with a single leaf, this parted into 5-13 lobed segments; petioles handsomely blotched with brown.

Xanthosoma pilosum Koch.—Kenoyer & Standley (p. 147). A common terrestrial plant, the large, broadly sagittate leaves finely pubescent.

Xanthosoma violaceum Schott. OTÓ. — Standley (Fl. 12). Called “badú” and “coco” by the West Indians. Planted at the laboratory; cultivated commonly for its edible tuberous roots, which are cooked and eaten like potatoes. The plant resembles closely the *Caladium* or Elephant-ear that is cultivated for ornament.

LEMNACEAE

Lemna cyclostasa (Ell.) Chev. DUCKWEED.—Standley (Fl. 12). Reported as occurring on the surface of quiet water about the island, but no specimens have been available for study. One of the most minute of all flowering plants.

BROMELIACEAE

Aechmea pubescens Baker.—Kenoyer & Standley (p. 147). A frequent epiphyte. Bracts at the base of the panicle entire.

Aechmea tillandsioides Baker.—Without locality, *Shattuck* 830. Bracts at the base of the panicle spine-toothed.

Ananas comosus (L.) Merr. (*A. sativus* Schult.). PINE-APPLE; PIÑA.—Standley (Fl. 12). Planted at the laboratory. Native of South America.

Ananas magdalenae André) Standl. PITA, PIÑUELA. — Standley (Fl. 12). Called “pingwing” by the West Indians. Common in the forest. Similar in appearance to the pineapple, the bright red flowers forming a large hard globose head. The long, slender, very spiny leaves contain a fiber of superior quality, “pita floja,” noted for its strength and fineness.

Billbergia pallidiflora Liebm.—Standley (Fl. 12). An epiphyte with pendent flower spikes, the few long leaves spiny-margined and handsomely blotched with silver. The plants usually are inhabited by ants with a painful bite.

Catopsis tenella Mez.—Standley (Fl. 12). A small epiphyte; flowers dioecious; leaves short, broad, thin, bright green, unarmed.

Guzmania minor Mez. — Standley (Fl. 12). An epiphyte with broad, thin, bright green, unarmed leaves; inflorescence short and dense, with showy, red or purple bracts.

Pitcairnia heterophylla (Lindl.) Beer? — Without locality, *Aviles* 61. The specimen is sterile, and the specific determination altogether uncertain, but the plant is evidently a species of *Pitcairnia*. The genus is new for the Canal Zone flora.

Tillandsia bulbosa Hook.—Standley (Fl. 12). A small epiphyte with very narrow leaves and a hard dark bulblike base. The plant usually is inhabited by ants.

Tillandsia compressa Bert.—Kenoyer & Standley (p. 147). Flower spike simple, strongly compressed, 3-4 cm. wide.

Tillandsia fasciculata Swartz. — Kenoyer & Standley (p. 147). Spike broad, as in the last preceding species, but not strongly compressed.

Tillandsia melanopus Morren.—Wheeler Trail, *Starry* 101. Juvenile plants only, but apparently referable to this species, in which the leaves are hard and blackish at the base, but not inflated.

Tillandsia monadelpha (Morren) Baker.—Plants small, the leaves thin, not inflated at the base. This species was reported incorrectly in the first list, as well as in the FLORA OF THE PANAMA CANAL ZONE, as *T. digitata* Mez (Standley, Fl. 12).

Tillandsia usneoides L. SPANISH MOSS. — Snyder-Molino Trail, *Shattuck* 414. What I take to be juvenile plants of this widely distributed epiphyte were collected on a treetop. They consist of elongate filiform unbranched stems covered with fine whitish scales. If not referable here, I can not guess what they may be.

Vriesia disticha (L.) Standl. — Fairchild Point, *Shattuck* 153; without locality, *Bailey* 39. A handsome small epiphyte with thin green unarmed leaves; inflorescence a simple spike with purple-red bracts.

Vriesia paniculata (L.) Mez. — Without locality, *Shattuck* 337. Leaves only, but referable here if to any bromeliad recorded from the region. The largest epiphytic bromeliad of the Canal Zone, often conspicuous on tall trees; inflorescence a large panicle.

COMMELINACEAE

Campelia Zanonina (L.) HBK.—Standley (Fl. 12). Frequent in forest. A coarse, erect herb a meter high with lanceolate leaves; flowers white, not enclosed in a spathe; fruit juicy, dark blue.

Commelina elegans HBK. DAYFLOWER; CODILLO.—Standley (Fl. 12). A succulent, procumbent herb, resembling the Wandering Jew of gardens; flowers enclosed in a spathe whose margins are united below, the petals bright blue and white. *Commelina longicaulis* Jacq., in which the margins of the spathe are free, must occur on the island.

Dichorisandra hexandra (Aubl.) Standl. — Standley (Fl. 12). An erect branching herb, or often somewhat scandent, with broad leaves; flowers blue.

Tradescantia cumanaensis Kunth.—Kenoyer & Standley (p. 147). A small, erect or ascending plant with glabrous leaves and white or pink flowers.

Tradescantia geniculata Jacq.—Standley (Fl. 12). Leaves pilose beneath; petals white.

PONTEDERIACEAE

Eichhornia azurea (Swartz) Kunth (*Piaropus azureus* Raf.). WATER-HYACINTH.—Standley (Fl. 12). Common in Gatun Lake and in quiet water generally. Petioles not inflated.

Eichhornia crassipes (Mart.) Solms. — Cove of Chapman Trail, *Woodworth & Vestal* 531. Petioles inflated and bulb-like. This species has not been listed previously for the Canal Zone. The native Water-hyacinth of Central America is *E. azurea*, but *E. crassipes*, a South American species, often is grown for ornament and in some places has escaped. How abundant the latter may be about the Canal Zone I do not know.

Pontederia rotundifolia L. PICKERELWEED. — Common in marshes. A coarse succulent plant with broad cordate leaves and dense spikes of white flowers. The Panama plant has been referred improperly to *P. cordata* L. (Kenoyer & Standley, p. 147), a species confined to the United States.

LILIACEAE

Taetsia fruticosa (L.) Merrill (*Cordyline fruticosa* [L.] Goepp.)—Standley (Fl. 13). Planted at the laboratory. The name *Dracaena* often is applied to plants of this group. This species is a tall, somewhat shrubby plant, with green or more often red or purple leaves. It is grown commonly in tropical America for ornament.

SMILACACEAE

Smilax domingensis Willd.—Fairchild Point, *Shattuck* 150; without locality, *Bailey* 489. A large prickly glabrous woody vine; leaves 5-7-nerved; peduncles shorter than the petioles. Some of the Central American species of *Smilax* furnish the sarsaparilla of commerce.

Smilax mollis Willd. — Standley (Fl. 13). A small unarmed vine with hairy leaves.

Smilax panamensis Morong. ZARZA.—Standley (Fl. 13). A glabrous prickly vine; leaves usually 3-nerved; peduncles much longer than the petioles. In the United States the names Cat-brier and Green-brier are applied to plants of this group.

HAEMODORACEAE

Xipidium caeruleum Aubl. PALMITA.—Standley (Fl. 13). An herb, common in forest; easily recognized by its leaves, which are 2-ranked, like those of an Iris; flowers small and whitish, paniced; fruit a small dull red berry.

AMARYLLIDACEAE

Crinum erubescens Soland.—Kenoyer & Standley (p. 147). Frequent on lake shores. A tall, coarse, bulbous plant with umbels of large white flowers; stamens red-purple.

Hymenocallis littoralis (Jacq.) Salisb. SPIDER-LILY.—Called "euchar lily" by the West Indians. Found in the forest on the site of a former dwelling; normally a seashore plant, but often grown for ornament because of its handsome white flowers, in which the filaments of the stamens are connected by a cuplike membrane. Through some error, the occasion for which is not now apparent, this plant was listed in the FLORA OF THE PANAMA CANAL ZONE under the fictitious name of "*Hymenocallis americana* (L.) Salisb."

DIOSCOREACEAE

Dioscorea alata L. YAM; ÑAME. — Standley (Fl. 13). Planted at the laboratory. A large herbaceous vine with narrowly winged stems. An important food plant of tropical America, grown for its large edible tubers.

Dioscorea macrostachya Benth.? — Without locality, *Shattuck* 582. Pistillate specimens only, and the species consequently doubtful.

Dioscorea urophylla Hemsl. BEJUCO DE SAINA. — Standley (Fl. 13). A slender vine with naked stems; leaves broadly ovate, abruptly cuspidate; flowers small and greenish, in slender racemes.

IRIDACEAE

Marica gracilis Herb.—Standley (Fl. 13). In forest. An inconspicuous herb with wide, linear leaves, the scapes broadly winged; flowers white; seeds with a bright red aril.

MUSACEAE

Heliconia acuminata Rich.—Standley (Fl. 13). A rather small plant with erect inflorescence; bracts deep red, narrow, widely spaced. The *Heliconias* form a conspicuous part of the forest undergrowth in the Canal Zone, eight species of them being known from the region. The usual Spanish name is *platanillo*; the West Indians call them “wild plantains.” The concave bracts of some species hold water in which mosquitoes and other insects breed.

Heliconia latispatha Benth. PLATANILLO, GUACAMAYA. — Standley (Fl. 13). Similar to the preceding species but much larger; inflorescence erect, glabrous, the bracts red, tinged with yellow or orange.

Heliconia Mariae Hook. BEEFSTEAK HELICONIA; PLATANILLO.—Standley (Fl. 13). The largest and showiest species of Panama, sometimes forming dense thickets; plants several meters high, their leaves as large as those of the banana; inflorescence very large, thick and heavy, with broad, closely crowded and overlapping, dull red bracts.

Heliconia pendula Wawra.—Standley (Fl. 13). A medium-sized plant, the inflorescence pendent, with widely spaced, dark red bracts.

Heliconia platystachys Baker.—Kenoyer & Standley (p. 147). A tall plant with recurved inflorescence; bracts widely spaced, glabrous, red and yellow.

Musa paradisiaca L. PLANTAIN; PLÁTANO.—Standley (Fl. 14). Planted at the laboratory. One of the important food plants of tropical America, of Old World origin.

Musa sapientum L. BANANA.—Standley (Fl. 14). Planted at the laboratory, and persisting about old clearings. The one important economic plant of the Atlantic coast of Central America, imported from the Old World soon after the conquest.

ZINGIBERACEAE

Costus hirsutus Presl.—Without locality, *Bailey* 117. A rather small plant, with densely pubescent leaves; bracts of the flower spike with leafy appendages. The species has not been reported previously from the Canal Zone.

Costus sanguineus Donn. Smith.—Standley (Fl. 14). A tall, almost glabrous plant with a simple stem composed of tightly rolled leaf petioles; flower spikes fusiform, with closely appressed, unappendaged, red bracts.

Costus spicatus (Jacq.) Swartz.—Standley (Fl. 14). Spikes cylindric or subglobose, the bracts not appendaged, in age becoming loose and spreading; plants nearly glabrous.

Costus villosissimus Jacq. CAÑAGRIA, CAÑA DE MICO.—Standley (Fl. 14). Plants often very tall, densely hirsute; bracts with spreading leafy appendages. One of the common and conspicuous plants of the region.

Dimerocostus uniflorus (Poepp.) Schum. — Standley (Fl. 14). Growing usually in water; stems simple and thick, usually 3-4 meters high; flowers in a terminal spike, white, 7-8 cm. long, opening one at a time.

Renealmia cernua (Swartz) Macbride (*R. strobilifera* Poepp. & Endl.)—Standley (Fl. 14). Frequent in forest. Stems leafy, 1.5-3 meters high; inflorescence terminal, cone-like, bright orange.

Renealmia occidentalis (Swartz) Sweet.—Standley (Fl. 14). Stems simple, leafy, growing in clumps, 1-2.5 meters high; inflorescences short, arising from the ground at the base of the plant; berries red or dark blue, with orange pulp.

Zingiber officinale Rosc. GINGER; GENGIBRE.—Without locality, *Aviles* 14. Probably a relic of some former planting. Ginger often is seen in Central American gardens, but it seldom flowers.

CANNACEAE

The two species of *Canna* known from the Canal Zone have not been reported for the island, but they are to be expected there.

MARANTACEAE

Calathea altissima Koern.—Without locality, *Bailey* 16. A coarse tall plant with broad, papery leaves on long, slender

petioles; flower heads large and globose, the corolla light yellow.

Calathea insignis Peters.—Standley (Fl. 14). Plants very large, the spikes strongly compressed, with thin, pale, parchment-like bracts.

Calathea lutea (Aubl.) Meyer. HOJA BLANCA.—Standley (Fl. 14). A tall coarse plant, often forming large colonies in marshes; leaves white beneath; spikes compressed, the bracts thick and leathery. One of the most common and showy plants of the Central American lowlands.

Calathea macrosepala Schum. BIJAO.—Standley (Fl. 14). Spikes small and headlike, not compressed; scape bearing one or more large leaves; perianth white or cream-colored.

Calathea violacea (Rosc.) Lindl.—Without locality, *Aviles* 15. Similar to the last species; perianth dark purple outside. It is decidedly doubtful whether *C. macrosepala* is more than a color form of this species.

Ischnosiphon leucophaeus (Poepp. & Endl.) Koern.—Standley (Fl. 14). A large slender plant, the broad leaves whitish beneath; flowers in very slender, terete spikes.

Myrosma guapilensis Donn. Smith.—Standley (Suppl. 121). A coarse herb, 1-2 meters high, with broad canna-like leaves; inflorescence of branched racemes, the flowers orange.

Myrosma panamensis Standl.—Standley (Fl. 14). Frequent in forest. A stemless, small plant, with leaves 30 cm. long; flowers in simple spikes.

Pleiostachya pruinosa (Regel) Schum.—Standley (Fl. 14). Immediately recognizable by the broad leaves, colored dark red or purple beneath; a slender plant 1-3 meters high with compressed flower spikes.

Thalia geniculata L.—West shore, *Wilson* 118. In water near end of Barbour Trail, *Woodworth & Vestal* 480. A slender plant 1-2 meters high with broad, stiff, canna-like leaves; branches of the inflorescence zigzag, the small flowers bright purple.

BURMANNIACEAE

Ophiomeris panamensis Standley in Jour. Wash. Acad. Sci. 17:163 (1927).—Known only from Barro Colorado Island, the type collected by C. W. Dodge; found also by Kenoyer. A

delicate white saprophyte, the slender stem bearing a single lopsided flower, three of whose divisions terminate in long filiform appendages. The plant is reported as plentiful in some seasons, but of all the collectors who have worked on the island, few seem to have found it. An illustration of the plant in its natural habitat will be found in *Field Mus. Bot.* 4: *pl.* 13, *f.* 1 (1929).

ORCHIDACEAE

Most of the orchids of the following list have been determined by Professor Oakes Ames. Orchids are not plentiful on the island, and they are difficult to collect, as they are always in the lowlands, because they grow on the branches of the tallest trees. The present list, greatly extended beyond the former ones, is the result chiefly of the work of Mr. Shattuck, who was able to reach the tree tops by the use of climbing irons.

Aspasia principissa Reichenb. f.—Standley (Fl. 14). Epiphytic.

***Brassia* sp.**—Pearson Trail, *Shattuck* 202. Specimens with fruit only.

Bulbophyllum pachyrrachis (A. Rich.) Griseb.—Standley (Fl. 15). Epiphytic; flowers minute, in pendent spikes having a thick, fleshy rachis.

Camaridium ochroleucum Lindl.—Fairchild Point, *Shattuck* 346. Epiphytic.

Campylocentrum panamense Ames.—Wheeler Trail, *Shattuck* 557.

***Campylocentrum* sp.**—Gross Point, *Shattuck* 844.

Catasetum viridiflavum Hook.—Standley (Fl. 15). A showy epiphyte, the succulent, green and yellow flowers suggesting those of a northern *Cypripedium* or Lady's-slipper. Common and frequently collected; often growing on exposed stumps.

Dichaea panamensis Lindl.? — Without locality, *Kenoyer* 260. A small pendent epiphyte, the short blunt leaves compressed and closely overlapping.

Epidendrum anceps Jacq.—Standley (Fl. 15). Epiphytic.

Epidendrum difforme Jacq.—Standley (Fl. 15). Epiphytic.

Epidendrum fragrans Swartz.—Without locality, *Shattuck* 551.

Epidendrum imatophyllum Lindl.—Without locality, *Shattuck* 221. Epiphytic.

Epidendrum ionophlebium Reichenb. f.—Lutz Trail, *Shattuck* 799.

Epidendrum nocturnum Jacq.—Without locality, *Shattuck* 490. Epiphytic.

Epidendrum radicans Pavón ex Lindl.—Floating island near Redwood House, *Woodworth & Vestal* 703, 705. A terrestrial plant with showy, red and orange flowers.

Epidendrum rigidum Jacq.—Fairchild Point, *Shattuck* 345; Lutz Trail, *Shattuck* 649. Epiphytic.

Epidendrum Rousseauae Schlechter.—Standley (Fl. 15). Epiphytic.

Epidendrum Schlechterianum Ames. — Without locality, *Shattuck* 222. A dwarf epiphyte, the densely clustered stems covered with short, broad, fleshy leaves.

Epidendrum sculptum Reichenb. f.—Without locality, *Shattuck* 558.

Epidendrum Stangeanum Reichenb. f. — Without locality, *Shattuck* 454.

Epidendrum stenopetalum Hook.—Standley (Fl. 15). Epiphytic.

Epidendrum strobiliferum Reichenb. f. — Fairchild Point, *Shattuck* 550.

Epidendrum subpatens Schlechter. — Wheeler Trail, *Shattuck* 216. Sterile specimens probably referable to this species.

Eulophia alta (L.) Fawc. & Rendle.—Edge of lake, *Starry* 247. A tall, coarse, terrestrial plant with long racemes of brownish red flowers.

Habenaria alata Hook.—Kenoyer & Standley (p. 148). Clearings and marsh islands. Terrestrial, like other species of the genus.

Habenaria bicornis Lindl.—Without locality, *Bailey* 663.

Habenaria repens Nutt.—Without locality, *Woodworth & Vestal* 55A, 65A.

Lockhartia pallida Reichenb. f.—Zetek Trail, *Shattuck* 234; Gigante Bay, *Shattuck* 837. Epiphytic; leaves compressed, two-ranked, and imbricated.

Maxillaria Friedrichsthali Reichenb. f.—Without locality, *Shattuck* 543.

Maxillaria uncata Lindl.—Standley (Fl. 15). Epiphytic.

Oncidium ampliatus Lindl. BUTTERFLY ORCHID.—Standley (Fl. 15). A handsome and showy plant with panicles of large, yellow and brown flowers suggestive of butterflies.

Oncidium stipitatum Lindl.—Without locality, *Shattuck* 559; *Woodworth & Vestal* 529. An epiphyte with terete leaves.

Ornithidium anceps Reichenb. f.—Without locality, *Shattuck* 544. Epiphytic.

Ornithocephalus bicornis Lindl.—Standley (Fl. 15). Epiphytic; easily recognized by the small fleshy leaves, resembling those of an Iris. Flowers minute, yellow, somewhat suggestive of a bird's head, hence the generic name.

Peristeria elata Hook. DOVE or HOLY GHOST ORCHID; ESPIRITU SANTO.—Standley (Fl. 15). A tall, coarse, terrestrial plant, with a raceme of rather large, white flowers whose central organs suggest strikingly a dove with outspread wings. This famous orchid has become rather rare about the Canal Zone, but it has been collected several times on Barro Colorado Island.

Pleurothallis acrisepala Ames & Schweinf.—Without locality, *Kenoyer* 256. A small epiphyte, like other local species of the genus. The species is new to the Canal Zone flora.

Pleurothallis Brighamii Wats.—Standley (Fl. 15). A small plant with very short stems.

Pleurothallis marginata Lindl.—Standley (Fl. 15). A small plant with obovate or orbicular leaves.

Pleurothallis verecunda Schlechter. — Without locality, *Shattuck* 722; Pearson Trail, *Shattuck* 546. Plants with well-developed stems; flowers yellow, with a purple dot in the center.

Polystachya minor Fawc. & Rendle.—Wheeler Trail, *Shattuck* 228. A small epiphyte with spikes of inconspicuous flowers.

Rolfea Powellii Ames.—Barbour Lathrop Trail, *Starry* 323. A tall, terrestrial plant with thin, lance-elliptic leaves and small, creamy white flowers. Known previously only from the region of Juan Díaz, beyond Panama City. The only other species of the genus is native in Trinidad and British Guiana. The flowers are illustrated in FLORA OF THE PANAMA CANAL ZONE,

p. 129. The species was named for C. W. Powell, who collected intensively the orchids of Panama and established a large collection of the living plants at Balboa.

Scaphyglottis Behrii (Reichenb. f.) Benth. & Hook. f. ex Hemsl.—On tree, cove west of Drayton House, *Woodworth & Vestal* 592. An epiphyte, like other species of the genus.

Scaphyglottis unguiculata Schlechter. — Without locality, *Kenoyer* 251.

Schomburgkia sp.—Without locality, *Shattuck* 500.

Sobralia panamensis Schlechter.—Standley (Fl. 15). A large terrestrial plant, forming clumps of leafy stems; flowers large, purple, very showy, but lasting for only part of a day, opening in the morning and closing about noon. One of the handsomest of Central American orchids.

Stelis crescentiicola Schlechter.—Gross Point, *Shattuck* 846. Epiphytic. Kenoyer collected on Barro Colorado an undetermined species of *Stelis* which may be this or some other member of the genus.

Stenorrhynchus sp.—Kenoyer & Standley (p. 148). Collected by Kenoyer. Terrestrial.

Trichopilia maculata Reichenb. f.—Without locality, *Shattuck* 555. Epiphytic.

Trichopilia subulata Reichenb. f.—Without locality, *Shattuck* 548. Probably this species, which has not been reported from the Zone.

Trigonidium Egertonianum Batem.—Shore of cove west of Drayton House, *Woodworth & Vestal* 593; in flower in February. An epiphyte, often forming large clumps; leaves long and strap-shaped; scapes slender, bearing a single, large, greenish-bronze flower.

Triphora cubensis (Reichenb. f.) Ames. — Kenoyer & Standley (p. 148). A small saprophyte, collected by Kenoyer in the laboratory clearing. Unknown otherwise from Panama.

Vanilla fragrans (Salisb.) Ames. VANILLA; VAINILLA. — Without locality, *Shattuck* 230; collected also by Bailey. Sepals and petals 5 cm. long. A large vine, climbing high on trees. It is difficult to find vanilla plants in flower, although they are plentiful enough in the forests.

Vanilla pompona Schiede. VANILLA; VAINILLA.—Standley

(Fl. 15). Sepals and petals 7.5 cm. long or more; leaves larger than in the preceding species.

PIPERACEAE

Peperomia Baileyae Trel., sp. nov. ined.—Without locality, *Bailey* 84. A slender, creeping, succulent herb with oblong-lanceolate, short-petioled leaves; sparsely pubescent. Known only from Barro Colorado.

Peperomia conjungens Trelease in Contr. U. S. Nat. Herb. 26:45 (1927).—Type collected on Barro Colorado, *Standley* 31342. The species has been collected at Frijoles and Las Cascadas Plantation, and several times lately on the island. A small, fleshy herb; leaves alternate, lanceolate or subrhombic. acute at the base.

Peperomia cordulilimba C. DC. var. *longependula* C. DC.—*Standley* (Fl. 15). Leaves alternate, thin, pinnately nerved.

Peperomia gatunensis C. DC.—*Standley* (Fl. 15). Leaves alternate, thin, pinnately nerved.

Peperomia Killipi Trel.—Without locality, *Shattuck* 545; Shannon Trail, *Shattuck* 453; dock, *Shattuck* 596. Leaves long-petioled, thin, rounded-ovate; plants erect, with numerous long, slender, long-stalked spikes.

Peperomia mameiana C. DC.—*Kenoyer & Standley* (p. 148). A coarse succulent epiphyte with large, very thick leaves and paniced spikes.

Peperomia rotundifolia (L.) HBK.—*Standley* (Fl. 15). A slender creeping epiphyte with very small, rounded, lens-shaped leaves.

Peperomia viridispica Trel.—*Pearson Trail, Shattuck* 207. Leaves verticillate, obovate, thick and fleshy.

Piper acutissimum Trel. CORDONCILLO.—*Standley* (Fl. 15). All the species of *Piper* growing in this region are terrestrial shrubs, easily recognized by their terete, catkin-like spikes. A large number of species grow in the region, and many of them can be separated only with difficulty. While the majority of the species seem to be based on good characters, in some groups the forms are too closely related, and ultimately, some of them will have to be reduced to synonymy—and others, probably, described as new.

Piper auritum HBK. SANTA MARÍA.—Standley (Fl. 15). A large, coarse, suffrutescent plant, rarely becoming a small tree, easily recognized by its very large, flabby, deeply cordate leaves, and by the distinctive odor of the crushed leaves, suggestive of sarsaparilla. Frequent in open places.

Piper breve C. DC.—Kenoyer & Standley (p. 148). Leaves broad, copiously pubescent beneath.

Piper carrilloanum C. DC.—Without locality, *Bailey* 30. Determined by Trelease. A shrub 1.5 meters high. The species is new for the Canal Zone.

Piper cordulatum C. DC.—Standley (Fl. 15). Frequent.

Piper culebranum C. DC.—Standley (Fl. 15).

Piper darienense C. DC.—Pearson Trail, *Bailey* 88. Determined by Trelease.

Piper diazanum Trel.—Without locality, *Bailey* 55, a shrub 1.5 meters high, determined by Trelease; edge of lake, *Starry* 218.

Piper Frostii Trel., sp. nov. ined.—Without locality, *Frost* 165, 42; near the laboratory, *Bailey* 495; without locality, *Aviles* 34.

Piper imperiale (Miq.) C. DC.—Standley (Fl. 15). Leaves very large, the blades unequal and cordate-auricled at the base; distinguished by the fleshy tubercles of the petioles.

Piper laxispicum Trelease in Contr. U. S. Nat. Herb. 26:24 (1927). Type from Barro Colorado Island, *Standley* 31375. A variety of the species has been described from Puerto Obaldía on the San Blas Coast.

Piper paulownifolium C. DC.—Standley (Fl. 15).

Piper peltatum L. (*Pothomorphe peltata* Miq.) SANTA MARÍA.—Standley (Fl. 16). Herbaceous or suffrutescent; leaves very large, rounded-cordate, peltate; flower spikes several on a common peduncle (solitary in other species).

Piper peracuminatum C. DC.—Kenoyer & Standley (p. 148). Leaves cordate-auricled at the base, long-acuminate, pubescent beneath, glabrous on the upper surface between the veins.

Piper polyneurum C. DC.—Without locality, *Aviles* 36; Armour Trail, *Starry* 63; Wheeler Trail, *Starry* 95.

Piper pseudo-cativaleense Trel.—Standley (Fl. 15).

Piper pseudo-garagaranum Trelease in Contr. U. S. Nat.

Herb. 26:28 (1927).—Type from Barro Colorado Island, *Standley* 31409. Known only from the island.

Piper pseudo-variabile Trel.—Standley (Fl. 15).

Piper pubistipulum C. DC. var. **estylosum** Trelease in Contr. U. S. Nat. Herb. 26:28 (1927).—Type from Barro Colorado, *Standley* 31364.

Piper san-joseanum C. DC. HINOJO.—Standley (Fl. 16).

Piper smilacifolium C. DC.—Standley (Fl. 16). A common shrub of the island, the species distinguished by its large broad leaves.

Piper subnudispicum Trel.—Standley (Fl. 16).

Piper viridicaule Trelease in Contr. U. S. Nat. Herb. 26:32 (1927).—Type from Barro Colorado, *Standley* 31402. Known only from the original collection.

LACISTEMACEAE

Lacistema aggregatum (Berg) Rusby. — Orchid Island, *Wilson* 93; shore north of laboratory, *Woodworth & Vestal* 354. A small tree with alternate, glabrous, entire or obscurely dentate leaves; flowers minute, in clustered, bracted, axillary spikes.

ULMACEAE

Celtis iguanaea (Jacq.) Sarg.—Standley (Fl. 16). A shrub or small tree, the long branches pendent or clambering, armed with recurved spines; leaves serrate, 3-nerved; fruit a yellow drupe. A characteristic shrub of thickets.

Trema integerrima (Beurl.) Standley, comb. nov. (*Sponia integerrima* Beurling in Svensk. Vet. Akad. Handl. 1854:144. 1856). I have seen the following collections that apparently are referable to this species: P a n a m a : Barro Colorado Island, *Aviles* 58; Changuinola Valley, *Cooper & Slater* 18; vernacular name, "CAPULÍN MACHO." H o n d u r a s : Lancetilla Valley, *Standley* 54097; a tree 6-9 m. high, in pasture; vernacular name, "CAPULÍN."

Sponia integerrima has remained unknown since its description, probably because no specimens of it were available to students of the genus. It is strikingly distinct from the various forms of *T. micrantha* in its entire leaves, those of *T. micrantha* being finely or coarsely serrate.

Trema micrantha (L.) Blume.—Standley (Fl. 16). A small tree with rough oblong-lanceolate grayish leaves, the flowers minute; fruit a red drupe only 2 mm. long.

MORACEAE

Artocarpus communis Forst. BREADFRUIT; ARBOL DE PAN.—Standley (Fl. 16). Planted at the laboratory. Introduced from the Pacific Islands.

Castilla panamensis Cook. RUBBER TREE; ULE, HULE, CAUCHO.—Standley (Fl. 16). A medium-sized or large tree with large, oblong, hairy leaves. The only species of *Castilla* native about the Zone. Trees of this genus supply the rubber that is exported from some parts of Central America.

Cecropia arachnoidea Pittier. GUARUMO.—Without locality, *Bailey* 35. A medium-sized tree with peltate, deeply palmately-lobed leaves, white beneath; pistillate spikes 8 cm. long or less; staminate spikes 4.5 cm. long or shorter. All the *Cecropia* species of the Canal Zone are known from Barro Colorado. They are characteristic trees of second-growth, of unique and distinctive aspect. Their hollow trunks and branches always are inhabited by small but active ants with painful bites.

Cecropia longipes Pittier. GUARUMO.—Kenoyer & Standley (p. 148). Pistillate spikes stout, 8 cm. long or less; staminate spikes 8-12 cm. long.

Cecropia mexicana Hemsl. GUARUMO.—Kenoyer & Standley (p. 148). Pistillate spikes slender, 20-40 cm. long.

Coussapoa nymphaeifolia Standl. — Shore near Drayton House, *Woodworth & Vestal* 606. A small tree, epiphytic upon other trees; leaves large, entire, deeply cordate at the base, white-tomentose beneath.

Coussapoa panamensis Pittier.—Standley (Fl. 16). Leaves rounded at the base.

Ficus Colubrinae Standl.—Kenoyer & Standley (p. 148). An epiphytic shrub or small tree; receptacles (fruits) sessile, 5-6.5 mm. in diameter.

Ficus costaricana (Liebm.) Miq.—Standley (Fl. 16). A large tree; receptacles sessile, 8-12 mm. in diameter; leaves rounded or obtuse at the apex. The wild Figs of Panama are chiefly large or medium-sized trees, strangling or epiphytic in

habit, the larger trees commonly with wide buttresses. The local names are "MATAPALO," "HIGO," and "HIGUERO." The fruits are much like those of the cultivated Fig, but in most species they are too small and insipid to be eaten, except by birds and other lower animals.

Ficus crassiuscula Warb.—Standley (Fl. 16). A large tree; receptacles solitary; leaves glabrous, very obtuse.

Ficus glabrata HBK. HIGUERÓN. — Standley (Fl. 16). A tall tree with large receptacles 1.5-4 cm. in diameter or even larger; leaves smooth or nearly so, gradually acute or acuminate.

Ficus Hemsleyana Standl.—Standley (Fl. 16). Receptacles in pairs, stalked; leaves oblong to ovate, long-petiolate.

Ficus involuta (Liebm.) Miq.—Kenoyer & Standley (p. 148). Leaves cuneate-obovate; receptacles in pairs, large, stalked.

Ficus nymphaeifolia L.—Without locality, *Bailey* 373; dock, *Shattuck* 267; shore east of laboratory, *Woodworth & Vestal* 392. A strangling tree, easily recognized by its large, deeply cordate leaves. Although this species has been reported from North America on one or more occasions, the present specimens are the only North American examples I have ever seen that are surely referable to *F. nymphaeifolia*. The species occurs also in Colombia.

Ficus Oerstediana Miq.—Standley (Suppl. 121). A small tree; leaves oblong-obovate, 4-11 cm. long, short-petiolate; receptacles in pairs, stalked, only 5-6 mm. in diameter. This species has the smallest fruits of all the *Ficus* species of Central America.

Ficus padifolia HBK.—Standley (Suppl. 121). A tree 8 meters high, with small oblong-lanceolate leaves and small stalked receptacles. Known in the region of the Canal Zone only from Barro Colorado Island.

Ficus panamensis Standl.—Without locality, *Bailey* 73. A tall tree. The species has not been detected previously in the Canal Zone.

Ficus Tonduzii Standl.—Standley (Fl. 16). Common. A tall tree; leaves oval or obovate-oval, 12-25 cm. long, with few, very coarse, remote veins.

Ficus velutina Willd. — Strangling a dead tree in Gatún Lake, *Bailey* 408. Leaves densely hairy. The species is new to the Canal Zone flora.

Helicostylis latifolia Pittier. BERBÁ, CHOYBÁ, QUERENDO.—Standley (Fl. 16). A large tree; leaves elliptic or obovate, 4-9 cm. long, entire, glabrous.

Olmedia aspera Ruiz & Pavón.—Standley (Fl. 16). A shrub or small tree; leaves oblong, rough, long-cuspidate, serrate toward the apex; pistillate receptacles 1-flowered. Common in the forest.

Poulsenia armata (Miq.) Standl. (*Inophloeum armatum* Pittier). NAMAGUA, MARAGUA, COCUÁ.—Standley (Fl. 16). A large tree; leaves narrow, rough; stipules and branchlets with stout prickles. From the bark of this tree the Central American Indians formerly made a coarse cloth that they used for hammocks, blankets, sails, and clothing. Such bark cloth is said to be made even at the present time from this and other trees of the Moraceae in certain remote regions of Panama, as well as on the Mosquito Coast of Nicaragua and in Honduras.

Pourouma aspera Trécul. MANGABÉ.—Kenoyer & Standley (p. 148). A tall tree with large, long-stalked, deeply palmately-lobed leaves, resembling those of the *Cecropias* but not petate; flowers in loose cymes. The hollow petioles are used by boys to make popguns.

Sorocea affinis Hemsl.—Standley (Fl. 16). A shrub or small tree; leaves oblong or obovate-oblong, caudate-acuminate, entire or sinuate, glabrous; pistillate flowers in lax, interrupted spikes, the small fruits red and showy.

Trophis racemosa (L.) Urban.—Standley (Fl. 16). A medium-sized tree; leaves oblong to oval, abruptly acuminate or cuspidate, entire, rough; staminate flowers in slender catkins; fruits 1 cm. or less in diameter, dull red, arranged in spikes.

URTICACEAE

Boehmeria cylindrica (L.) Swartz.—Standley (Fl. 16). In shallow water about the edge of the lake. An erect herb with opposite, ovate, toothed leaves; flower clusters arranged in long interrupted spikes.

Myriocarpa yzabalensis (Donn. Smith) Killip.—Standley (Fl. 17). A shrub or small tree, without stinging hairs, the

large leaves ovate or obovate, long-petioled, closely crenate-serrate; flowers minute, in very slender, pendent, paniced, white spikes as much as 60 cm. long.

Pilea serpyllacea (HBK.) Liebm. — Laboratory clearing, *Shattuck* 196. A cultivated species, probably escaping here; usually called "LACE PLANT" in Panama. A small, brittle, succulent herb with entire leaves.

Pouzolzia obliqua Gaud.—Kenoyer & Standley (p. 148). A slender shrub; leaves ovate to oblong, very oblique at the base, entire, the petioles 1 cm. long; flowers clustered in the leaf axils.

Pouzolzia occidentalis Wedd.—Without locality, *Aviles* 24. Leaves not oblique at the base, the petioles 2-8 mm. long.

PROTEACEAE

Roupala darienensis Pittier.—Standley (Fl. 17). A small tree with skunklike odor; leaves partly pinnate and partly simple, alternate; flowers small, in racemes.

LORANTHACEAE

Oryctanthus cordifolius (Presl) Urban.—Gross Point, growing on *Coccoloba nematostachya*, *Shattuck* 425. A small, shrubby parasite, like all other local members of the family; flowers immersed in the rachis of the spike; leaves sessile, with somewhat clasping bases.

Oryctanthus occidentalis (L.) Eichl.—Zetek Trail, *Shattuck* 265; shore 2 miles east of the laboratory, on *Nectandra*, *Woodworth & Vestal* 492. Leaves short-petioled, not clasping; flowers perpendicular to the rachis of the spike.

Oryctanthus spicatus (Jacq.) Eichl. — Standley (Suppl. 121). Similar to the last species, but the flowers inserted obliquely along the rachis.

Phoradendron piperoides (HBK.) Trel.—Shore of a cove west of Fuertes House, *Woodworth & Vestal* 663. Branches terete; leaves lanceolate or ovate, acute or acuminate.

Phoradendron venezuelense Trel. — Near Barbour Point, *Wilson* 146. Stems 4-angled; leaves oblong or lance-oblong, obtuse or rounded at the apex.

Phthirusa pyrifolia (HBK.) Eichl.—Standley (Suppl. 121). Leaves oblong or oblong-ovate, obtuse; flower spikes brown-scurfy, the flowers not immersed in the rachis.

OLACACEAE

Heisteria costaricensis Donn. Smith.—Standley (Fl. 17). A slender shrub with alternate, entire, linear-lanceolate leaves 1.5-2.5 cm. wide; pedicels shorter than the fruiting calyx, this becoming large, saucer-shaped, and deep red; fruit a dark blue drupe. Growing, like the other species, in deep forest. All the species known from the Zone have been collected on Barro Colorado. They may be recognized at once by the curious red calyx, surrounding the small drupe of contrasting color.

Heisteria longipes Standl.—Kenoyer & Standley (p. 149). Leaves elliptic or oblong-elliptic; pedicels much longer than the fruiting calyx.

Heisteria macrophylla Oerst. AJICILLO. — Standley (Fl. 17). Leaves oblong-elliptic, 3.5-6 cm. wide; pedicels shorter than the calyx.

ARISTOLOCHIACEAE

Aristolochia Chapmaniana, sp. nov. (*A. maxima* L. var. *cordata* Standley in Field Mus. Publ. Bot. 8:136. 1930.)—Pl. IX.—Scandens fruticosa, caulibus gracilibus striatis sparse hispidulis; folia breviter petiolata, subcoriacea, petiolo gracili 6-10 mm. longo hispidulo; lamina oblonga vel anguste oblonga 9-19.5 cm. longa 2.5-4 cm. lata, acuta vel subobtusa, basi profunde anguste cordata, auriculis rotundatis interdum paullo inaequalibus usque ad 1 cm. longis, supra sublucida, sparse albido-puncticulata, ad costam sparse hispidula, nervis prominulis reticulatis, basi 7-nervia, subtus paullo pallidior, ad costam minute hispidula, aliter microscopice puberula vel fere glabra, nervulis elevatis arcte reticulatis; racemi axillares omnes ut videtur uniflori, floribus magnis, pedunculis 1.5-2 cm. longis sparse pilosulis et puberulis, bracteis lineari-lanceolatis dorso sparse pilosulis attenuatis 10-15 mm. longis deciduis; calyx extus sparse pilosus, utriculo 4-5 cm. longo et 2 cm. lato subinaequilatero, tubo subrefracto 2.5-3.5 cm. longo supra utriculum 4-5 mm. lato apice 8-10 mm. lato, labio lanceolato-oblongo circa 7 cm. longo et 2 cm. lato acuto et in caudam filiformem 5 mm. longam subito contracto.

P a n a m a : Barbour Point, Barro Colorado Island, Canal Zone, November 15, 1931, *Otis Shattuck* 413 (Herb. Field Mus. No. 647657, type); shore of Gatún Lake, south of the

laboratory, Barro Colorado Island, August 28, 1929, *W. N. Bangham* 445 (type of var. *cordata*, in herb. Arnold Arb.).

Aristolochia maxima var. *cordata* was based upon a fruiting specimen. It was suspected that it really represented a distinct species, but in the absence of flowers its status could not be decided. The excellent flowering material collected by Mr. Shattuck shows that the plant, although related to *A. maxima*, differs from it not only in the deeply cordate leaf bases but in the much greater dimensions of the flowers, as well as in the different form of their parts.

The species is named for Dr. Frank M. Chapman, whose delightful book upon the natural history of Barro Colorado Island will charm everyone who has the slightest interest in the native life of the American tropics.

***Aristolochia pilosa* HBK.**—Kenoyer & Standley (p. 149). A small, herbaceous vine, the stems hirsute or pilose with brown hairs; leaves deeply cordate at the base; calyx limb pale green with purple-brown dots, the throat dark purple-brown.

***Aristolochia sylvicola* Standl.**—Pl. VIII A.—Standley (Fl. 17). Climbing high on trees; known only from the Canal Zone, the following recent collections being from Barro Colorado Island: Zetek Trail, *Shattuck* 640; Wheeler Trail, *Wetmore & Abbe* 1, 1A. Stems slender, woody, covered with corky wings; leaves large and thin, broadly ovate, truncate at the base, white-tomentose beneath; limb of the calyx about 20 cm. long, mottled with purple-brown; mature capsule 12.5 cm. long and 3 cm. in diameter.

RAFFLESIACEAE

***Apodanthes Flacourtiae* Karst.** — Kenoyer & Standley (p. 149). On branches of *Xylosma Hemsleyana*; a minute parasite, appearing as rows of waxy-white flowers 5 mm. in diameter that burst through the bark of the host. For an illustration see *Field Mus. Bot.* 4: pl. 13, f. 2 (1929). One of the smallest flowering plants of tropical America, scarcely exceeding in size some of the Lemnaceae. This is one of the most curious and remarkable plants found thus far on the island. It has not been discovered elsewhere in North America.

POLYGONACEAE

Coccoloba acuminata HBK.—Standley (Fl. 17). A slender shrub; leaves oblong-lanceolate, long-acuminate, barbate beneath along the costa; stipules sheathing, as in other species; flowers minute, in racemes; fruiting calyx fleshy, becoming bright red.

Coccoloba changuinolana Standl. — Standley (Suppl. 121). A tree 12 meters high; leaves oval or oval-elliptic, acute or rounded and short-acuminate, glabrous. In the Canal Zone this species has been found only on Barro Colorado.

Coccoloba leptostachya Benth.—Standley (Fl. 17). A tree; leaves oblong to ovate, glabrous. The young leaves are bright purplish red and conspicuous in the forest.

Coccoloba nematostachya (Griseb.) Lindau. HUESO. — Standley (Fl. 17). A small tree; leaves obovate, acute or very shortly acuminate, puberulent beneath, not barbate.

Polygonum punctatum Ell. SMARTWEED. — Kenoyer & Standley (p. 149). A weedy herb with narrow leaves, the flowers in interrupted greenish racemes.

Triplaris americana L. GUAYABO HORMIGUERO, PALO SANTO.—Standley (Fl. 17). A tall forest tree with large, hairy, oblong to elliptic leaves; flowers dioecious, the pistillate purplish red and very showy, in paniced racemes, the calyx in fruit 5 cm. long. The hollow branches usually are inhabited by ants, commonly a species of *Pseudomyrma*. When in full flower, or rather fruit, in the spring, *Triplaris* trees are exceedingly showy and handsome. The unique fruiting calyx has three somewhat recurved spatulate segments. When it falls from the tree it whirls rapidly, and descends slowly, like a parachute, commonly reaching the ground at some distance from the tree.

AMARANTHACEAE

Alternanthera ficoidea (L.) R. Br.—Standley (Fl. 17). A small, prostrate, weedy herb; flower heads small, white, sessile in the leaf axils; utricle shorter than the sepals. A frequent weed of tropical America.

Alternanthera sessilis (L.) R. Br.—Standley (Fl. 17). Utricle obcordate, longer than the sepals; flower heads only 3 mm. thick. A frequent weed.

Amaranthus gracilis Desf. PIGWEED; BLEDO, CALALÚ. — Kenoyer & Standley (p. 149). Laboratory clearing and elsewhere. Native of the Old World tropics probably; a frequent weed of tropical America.

Celosia argentea L.—Standley (Fl. 17). A few plants found once, probably an escape from cultivation. The cristate form of this species, called *Celosia cristata* L., is the Cockscomb or Abanico of gardens.

Chamissoa altissima (Jacq.) HBK.—Without locality, *Shattuck* 737. Plants suffrutescent or herbaceous, usually more or less scandent; leaves alternate, slender-petioled; flowers dioecious; fruit 1-seeded, the seed with a fleshy aril.

Cyathula prostrata (L.) Blume. CADILLO.—Standley (Fl. 17). A procumbent or ascending, herbaceous weed with bur-like flower clusters that adhere to clothing; introduced from the Old World.

Gomphrena dispersa Standl. — Kenoyer & Standley (p. 149). Laboratory clearing. A low weedy herb with dense showy small heads of white flowers; similar to the Globe Amaranth or Immortelle (*Gomphrena globosa*) of gardens.

Iresine angustifolia Euphr.—Without locality, *H. K. Svenson* 431; banana clearing, *Shattuck* 825. A slender herb with opposite, narrowly lanceolate leaves. In Central America this species normally grows on seashores.

Iresine Celosia L.—Standley (Fl. 17). A tall weedy herb, often somewhat scandent; leaves narrowly or broadly ovate; flowers very small, in loosely paniced spikelets, covered with white, cottony hairs. One of the most abundant weeds of tropical America, growing almost everywhere in Central America at low and middle elevations.

NYCTAGINACEAE

Neea Pittieri Standl.—Standley (Fl. 17). A shrub or small tree; leaves opposite, entire, 6-12 cm. wide, acute or acuminate; flowers greenish, in small cymes; fruit an oblong, dark purple drupe. Frequent in the forest.

Neea psychotrioides Donn. Smith.—Without locality, *Bailey* 120; Barbour-Lathrop Trail, *Shattuck* 121. Leaves much smaller than in *N. Pittieri*. A widely distributed species of Central America, but not reported previously from the Canal Zone.

Pisonia aculeata L.—Standley (Fl. 17). In thickets. A large shrub or small tree, the branches armed with stout recurved prickles; fruits small, dry, club-shaped, the 5 angles with rows of small sticky glands.

PHYTOLACCACEAE

Microtea debilis Swartz.—Kenoyer & Standley (p. 149). A small, weedy annual with alternate entire leaves, the minute, green or whitish flowers in slender racemes; fruits minute, tuberculate.

Petiveria alliacea L. ANAMÚ.—Standley (Fl. 18). Called “gully root” and “guinea-hen weed” by the West Indians. A weedy herb, the crushed leaves with a strong odor of garlic; flowers appressed to the rachis of the spike; fruit with 4 small hooked bristles. The plant is a noxious weed. The fruits adhere to clothing, and penetrate the flesh painfully if one brushes carelessly against the plant. If cows eat the foliage, its flavor is said to be imparted to their milk.

Phytolacca rivinoides Kunth & Bouché. POKEBERRY. — Kenoyer & Standley (p. 149). A coarse weed of waste ground, very similar to the common Pokeweed of the United States. The racemes of small, white or pink flowers on a carmine rachis, and the black or purple berries are rather ornamental.

Rivina humilis L.—Kenoyer & Standley (p. 149). Collected once in the laboratory garden, but not known otherwise, apparently, from the Canal Zone. A common weed of some parts of tropical America. An erect herb with racemes of small, whitish flowers and juicy, carmine-red fruits.

PORTULACACEAE

Portulaca oleracea L. PUSLEY; VERDOLAGA.—Standley (Fl. 18). A rare weed in open places. The plants are much used in Central America as “greens” or pot herbs. The species is generally distributed in tropical and temperate regions, and is a common weed of United States gardens.

NYMPHAEACEAE

Nymphaea ampla (Salisb.) DC. WATERLILY.—Pl. VII B.—Standley (Fl. 18). Called “duckweed” by the West Indians. Growing in quiet water about the edge of the lake. A handsome plant with large white flowers.

MENISPERMACEAE

Chondodendron hypoleucum, sp. nov.—Pl. X.—Frutex scandens, ramulis novellis crassiusculis teretibus striatis densiuscule molliter puberulis; folia magna, longe petiolata, subcoriacea, petiolo gracili 10-14 cm. longo tomentuloso; lamina ovato-rotundata, 11-17 cm. longa et 13-18 cm. lata, apice obtusa vel late rotundata et mucronato-apiculata, basi truncata vel breviter lateque cordata, 5-nervia, supra viridis glabra, costa subimpressa, venis prominulis, ultimis arctissime reticulatis, subtus densissime albo-tomentosa nervis venisque prominentibus; paniculae ut videtur e ramis vetustis fasciculatim ortae, 6.5 cm. longae vel ultra, rhachibus dense tomentosis, pedicellis crassis circa 2 mm. longis; sepala exteriora 9, minuta, vix 1 mm. longa, sparse tomentella, 6 interiora 2.5 mm. longa, ovalia, glabra, apice obtusa vel rotundata, recurvo-patentia; petala minuta, vix 0.5 mm. longa, late ovata, obtusa; stamina 6 libera, filamentis crassis supra angustatis sepalis duplo brevioribus.

P a n a m a : Barro Colorado Island, Canal Zone, shore east of Gross Trail, Feb. 6, 1932, *R. H. Woodworth & P. A. Vestal* 438 (Herb. Field Mus. No. 651883, type); Barro Colorado Island, in wet forest, November, 1925, *Standley* 41007.

Until the type specimen of the species described was collected, only sterile material was available for study. This was reported from Barro Colorado Island doubtfully as *Sciadotenia* sp., but the plant now proves to be referable rather to the genus *Chondodendron*, and related to *C. tomentosum* Ruiz & Pavón, of Peru. It is the first member of the genus to be reported from North America.

Cissampelos Pareira L. — Standley (Fl. 18). A slender vine; leaves rounded, peltate, velvety; flowers dioecious; fruits small and juicy, orange-red; bracts of the staminate inflorescence much reduced or absent. The plant is much used in domestic medicine in Central America.

Cissampelos tropaeolifolia DC.—Standley (Fl. 18). Growing in forest. Similar to the preceding but with larger, thinner, less hairy leaves; bracts of both staminate and pistillate cymes large and foliaceous.

Hyperbaena panamensis Standl. — Standley (Fl. 18). A slender, woody vine; leaves coriaceous, ovate to oblong, acu-

minate, 3-nerved. Known only from the region of the Canal Zone.

Odontocarya truncata Standley in Jour. Arnold Arb. 11:121 (1930).—Type collected on Barro Colorado Island, between Armour House and the second bay north, *W. N. Bangham* 541. A scandent shrub, known only from the island; leaves long-petiolate, subcoriaceous, glabrous, ovate or rounded-ovate, truncate at the base; pistillate flowers racemose; drupes oval, yellow, 1.5 cm. long.

ANNONACEAE

Annona acuminata Safford. CAMARÓN.—Standley (Fl. 18). A shrub or small tree; leaves oblong-lanceolate, small, glabrous or nearly so; fruit tuberculate, about 2.5 cm. in diameter, splitting open when fully ripe and exposing the orange pulp and dark brown seeds.

Annona glabra L. POND-APPLE.—Kenoyer & Standley (p. 149). A large shrub or small tree, usually growing along water; leaves glabrous; flowers large, globose, with 6 broad petals; fruit smooth.

Annona Hayesii Safford.—Standley (Fl. 18). A shrub or small tree; leaves broadly obovate, thinly sericeous beneath; flowers elongate and narrow, with narrow petals; fruit smooth, subglobose, 5 cm. long.

Annona Spraguei Safford. CHIRIMOYA, NEGRITO.—Standley (Fl. 18). A tree; leaves large, elliptic-oblong, 15-30 cm. long, densely soft-pubescent beneath; petals 3, broad; fruit 5 cm. long, covered with clawlike tubercles.

Desmopsis panamensis (Robinson) Safford.—Standley (Fl. 18). A shrub or small tree; leaves oblong-elliptic, acuminate, pubescent beneath; flowers borne on young branches in the leaf axils, long-stalked, greenish yellow; fruit a cluster of stalked, oval, pubescent berries. Frequent in the forest.

Guatteria amplifolia Triana & Planch.—Standley (Fl. 18). Frequent. A shrub or small tree; leaves oblong or elliptic, 20-30 cm. long, acuminate, almost glabrous; flowers large, green or yellowish, with 6 large, subequal, leathery petals; fruit a cluster of numerous, small, oval berries borne on red stalks.

Guatteria dolichopoda Donn. Smith.—Kenoyer & Standley (p. 149). A tall tree on Armour Trail; leaves lance-oblong,

pilose, 14-20 cm. long, pilose; berries oval, glabrous. In the Canal Zone this species is known only from Barro Colorado.

Unonopsis Pittieri Safford.—Kenoyer & Standley (p. 149). A tree with large, oblong, acuminate, glabrate leaves; flowers borne on old naked branches; fruit a dense cluster of stalked, red or orange, globose berries.

Xylopia frutescens Aubl.—Kenoyer & Standley (p. 149). A slender shrub or small tree; leaves oblong-lanceolate, small, distichous, sericeous beneath; flowers narrow, the corolla less than 4 mm. thick. A characteristic shrub of the Pacific slope, but not plentiful on the Atlantic side of the isthmus.

Xylopia macrantha Triana & Planch. COROBÁ, RAYADO.—Standley (Fl. 18). A small tree; leaves much larger; corolla 1 cm. thick, the calyx more than 1 cm. long.

MYRISTICACEAE

Virola guatemalensis (Hemsl.) Warb.—Clearing, *Shattuck* 694; back of clearing at laboratory, *Wetmore & Abbe* 155. A tree 30-35 meters high, 25 meters to the lowest branches; leaves narrowly oblong, acuminate, glabrous beneath or nearly so. This species has not been collected previously in Panama.

Virola panamensis (Hemsl.) Warb. BOGAMANI, MALAGUETA DE MONTAÑA; WILD NUTMEG.—Standley (Fl. 18). A large tree, leaves alternate, short-petioled, entire, oblong, stellate-tomentose beneath; flowers minute, in axillary panicles; anthers acute. The *Virolas* are closely related to the Old World nutmeg. The fruit contains a similar seed, of almost equal size, surrounded by a beautiful lacelike aril. The seeds are a favorite food of many wild animals.

Virola Warburgii Pittier. — Without locality, *Bailey* 405; shore near the laboratory, *Wilson* 6. Much like the preceding species and doubtfully distinct from it; anthers obtuse.

MONIMIACEAE

Siparuna guianensis Aubl. HIERBA DE PASMO. — Standley (Suppl. 122). A strong-scented shrub; leaves opposite, short-petioled, oval-oblong, glabrous at maturity or nearly so, entire or obscurely dentate; flowers small, greenish, in small, axillary cymes; fruit fleshy, red, splitting open irregularly when ripe.

Siparuna pauciflora (Beurl.) A. DC.—Standley (Fl. 18). Common in forest. A large shrub; leaves broadly elliptic or obovate, large, densely and softly pubescent.

LAURACEAE

Nectandra glabrescens Benth. — Without locality, *Aviles* 113; *Bailey* 92, 307; Shannon Trail, *Shattuck* 535; shore north of Zetek House, *Woodworth & Vestal* 692. A large or medium-sized tree; leaves glabrous or nearly so; flowers small, white, the peduncles pink; style much shorter than the ovary.

Nectandra globosa (Aubl.) Mez. SIGUA.—Shore near the laboratory, *Wilson* 2; dock, *Shattuck* 314; Gross Point, *Shattuck* 429; without locality, *Shattuck* 458; shore east of laboratory, *Wetmore & Abbe* 43; west side of clearing near the laboratory, *Wetmore & Abbe* 17; cove north of the laboratory, *Woodworth & Vestal* 314. A small or large tree; leaves almost or quite glabrous; flowers white, rather showy; style equaling the ovary. One of the most frequent and widely distributed Laurels of Central America. Called "candlewood" by the West Indians, because the wood is said to burn easily.

Ocotea cernua (Nees) Mez. SIGUA.—Standley (Fl. 19). A shrub or small tree, frequent here; leaves glabrous; flowers small and inconspicuous, glabrous.

Persea americana Mill. ALLIGATOR PEAR, AVOCADO; AGUACATE.—Standley (Fl. 19). Planted at the laboratory. Presumably native in Mexico and Central America.

CAPPARIDACEAE

Capparis baducca L.—Standley (Fl. 19). A shrub or small tree, glabrous throughout; leaves long-petiolate, lanceolate to ovate, obtuse to acuminate, coriaceous; flowers few, racemose, white; fruit oblong, torose.

Cleome Houstoni R. Br.—Standley (Suppl. 122). A viscid-pubescent, prickly herb; leaflets 5, digitately disposed; petals pink or purplish.

Cleome panamensis Standl.—Without locality, *Bailey* 361. Plants small, weedy, prickly; leaflets 3. The species is new to the Canal Zone flora.

HYDRANGEACEAE

Hydrangea panamensis Standl.—Kenoyer & Standley (p. 150). A scandent shrub with sparse, stellate pubescence;

leaves oblong to ovate, obtuse or rounded and emarginate at the apex; inflorescence in bud covered with large rounded bracts, these caducous. On Barro Colorado there have been collected only juvenile plants of this species. They occur as small, creeping, epiphytic plants, which may be recognized readily by the minute, stellate hairs scattered over the leaves. It is a strange fact that in many parts of Central America juvenile *Hydrangea* plants of this type, very unlike adult ones, often occur in the greatest abundance, while it is almost impossible to discover flowering plants, probably because the latter are to be found only on the tallest trees.

ROSACEAE

Hirtella racemosa Lam.—Without locality, *Frost* 70. Shore near end of Fairchild Trail, *Wetmore & Abbe* 105. A slender shrub, growing in forest; leaves alternate, elliptic-oblong; flowers small, rose-purple or pink, in racemes; stamens 5, long-exserted; fruit a small drupe. In the FLORA OF THE PANAMA CANAL ZONE this plant is listed incorrectly as *Hirtella americana* L. That name belongs properly to the plant there called *H. mollicoma* HBK.

Hirtella triandra Swartz.—Standley (Suppl. 122). A small tree; leaves sparsely short-pilose beneath; flowers pinkish white, in thyrsiform panicles; stamens 3.

Licania hypoleuca Benth.—Standley (Fl. 19). A tall tree; leaves thin, acuminate, small, densely white-tomentose beneath. In the Canal Zone this species has been collected only on Barro Colorado.

Licania platypus (Hemsl.) Fritsch. SANGRE.—Kenoyer & Standley (p. 150). Frequent. A tall tree; leaves large, narrowly oblong, glabrous; fruit 15 cm. long or more, rough and brownish, edible. The tree is handsome, conspicuous because of the bronze coloring of the young foliage. The tree is frequent in many parts of Central America, and often is planted for shade. The fruit is little esteemed, especially because it is reputed to be "unhealthy," and its flavor does not recommend it.

Rosa sp.—Standley (Fl. 19). One of the common cultivated roses, planted at the laboratory.

CONNARACEAE

Cnestidium rufescens Planch.—Standley (Fl. 19). A large, woody vine; leaves odd-pinnate, the narrow leaflets densely pubescent beneath; capsules sessile, densely tomentose.

Connarus panamensis Griseb.—Standley (Fl. 19). A woody vine; leaflets 3, glabrous or nearly so; panicles densely brown-tomentose; calyx enlarged after anthesis; capsules sessile, glabrous or nearly so.

Connarus Turczinowii Triana & Planch. — Standley (Suppl. 122). Similar; leaflets 5; flowers yellow.

Rourea glabra HBK. — Standley (Fl. 19). A nearly glabrous vine; leaflets usually 5; flowers small, white; capsule stalked, glabrous; seed dark brown, shining, with an orange aril. The seeds of this plant are believed to be violently poisonous to man, and death is reported to have occurred after eating the flesh of birds that had fed upon the fruits.

LEGUMINOSAE

MIMOSEAE

Acacia Hayesii Benth.? UÑA DE GATO.—Standley (Fl. 19). So far only sterile specimens of this plant have been collected, and its identity is problematical.

Acacia melanoceras Beurl. BULLHORN ACACIA.—Kenoyer & Standley (p. 150). A shrub or small tree, armed with large hollow spines; flowers in globose heads. The spines are inhabited by savage ants which enter them by means of a hole that they cut near the apex. There is a separate colony of the insects in each spine, and they feed partly upon yellow nectar bodies produced upon the young leaves. The ants inflict painful bites upon any animal molesting the plant on which they live.

Acacia riparia HBK. — Without locality, *Shattuck* 436; shore east of Redwood House, *Wetmore & Abbe* 205; shore near end of Barbour Trail, *Woodworth & Vestal* 512. A small tree or a large vine, armed with small prickles; flowers in globose heads, white; pods flat, 2.5-3 cm. wide, thin, glabrous.

Albizzia adinocephala (Donn. Smith) Britt. & Rose. — Without locality, *Bailey* 281. A large or medium-sized tree; leaves bipinnate, the numerous large leaflets pale beneath,

acute or acuminate; flowers whitish, in globose heads; pods thin and flat, glabrous, 2.5 cm. wide. Listed in the FLORA OF THE PANAMA CANAL ZONE as *Pithecolobium adinocephalum* Donn. Smith.

Entada gigas (L.) Fawc. & Rendle (*E. scandens* [L.] Benth.). JAVILLA.—Standley (Fl. 19). A large woody vine, the stems compressed and twisted; leaves bipinnate, the leaflets 2-8 cm. long, the leaf ending in a tendril; flowers spicate, greenish yellow; pods usually 1-2 meters long, containing 10-12 dark brown or blackish, compressed seeds 5-6 cm. broad. The huge seeds are one of the several "sea beans" found commonly on tropical shores.

Entada polystachia (L.) DC.—Standley (Suppl. 122). A large woody vine; pods much smaller than in *E. gigas*, usually less than 8 cm. wide, not constricted between the seeds, these only 2 cm. broad.

Inga cocleensis Pittier.—Standley (Suppl. 122). A tree; leaf rachis not winged; leaflets 6 pairs, densely pubescent beneath; flowers spicate, the calyx 6-7 mm. long. This species is known in the Canal Zone only from Barro Colorado. The Ingas are mostly medium-sized trees with once-pinnate leaves having few large leaflets. There are many species of them in the lowlands of Central America, but, although much alike in general appearance, they usually are separated by good characters. There are now known from the island no less than 16 species, a larger number than was recorded in the FLORA OF THE PANAMA CANAL ZONE.

Inga confusa Britt. & Rose. — Standley (Suppl. 122). Rachis not winged; leaflets 4-6 pairs, short-acuminate, pubescent or glabrate; flowers spicate, the calyx 4 mm. long; pods flat, 2-2.5 cm. wide, pubescent. This tree was listed in the FLORA OF THE PANAMA CANAL ZONE as *I. Ruiziana* Don, a Peruvian species.

Inga edulis Mart. GUAVO, GUAVA. — Standley (Fl. 19). Rachis winged; leaflets 3-4 pairs, copiously pubescent; flowers spicate, the calyx 5 mm. long; fruit subterete, densely tomentose. The usual vernacular name in Panama for the Ingas is "guavo" or "guava" (the fruit). This is not to be confused with the English word Guava, applied to *Psidium*, which in Spanish is called Guayaba.

Inga Goldmanii Pittier. GUAVO DE MONO. — Standley (Fl. 19). Often a large tree; rachis winged; leaflets broad, 3-4 pairs, densely hairy; flowers spicate, the calyx densely pubescent; pods large, flat, densely hirsute.

Inga gracilipes Standl. GUAVO.—Standley (Suppl. 122). A tree 7 meters high; rachis winged; leaflets 2 pairs, glabrous; flowers in headlike umbels. Easily recognized by the umbellate flowers; known only from the Canal Zone.

Inga laurina (Swartz) Willd.—Standley (Suppl. 122). A tree 8 meters high; rachis not winged; leaflets 2-3 pairs, glabrous, obovate, cuneate at the base; flowers only 3 mm. long, in slender elongate spikes; pods flat, glabrous, 2.5 cm. wide.

Inga leptoloba Schlecht. GUAVITA CANSA-BOCA.—Kenoyer & Standley (p. 150). Rachis not winged; leaflets 3 pairs, somewhat pubescent beneath; flowers small, spicate; pods much thickened.

Inga marginata Willd. — Standley (Fl. 19). Rachis winged; leaflets glabrous; flowers spicate, the corolla 3 mm. long; fruit flat, 2 cm. wide, glabrous.

Inga Mucuna Duchass. & Walp.—Shore of cove west of Fuertes House, *Woodworth & Vestal* 665. Rachis broadly winged; leaflets 2-4 pairs, large, ovate to orbicular, densely pubescent; flowers spicate, the calyx 2 cm. long, glabrous below; pods 5 cm. broad, densely brownish-strigose. The species has not been recorded previously from the Canal Zone.

Inga multijuga Benth.—Shore of cove in front of Fuertes House, *Wetmore & Abbe* 223. A tree 12-15 meters high; rachis not winged; leaflets about 9 pairs. Easy of recognition because of the numerous leaflets.

Inga panamensis Seem. GUAVO.—Standley (Fl. 19). Rachis winged only between the upper two pairs of leaflets; leaflets 3 pairs, pubescent; flowers spicate; pods glabrous or almost so.

Inga pauciflora Duchass. & Walp.—Standley (Suppl. 122). Rachis winged; leaflets 3-4 pairs, pubescent; flowers spicate, the calyx 1 cm. long, with spreading pubescence; pods much thickened.

Inga Pittieri Micheli.—Shore near Termite House, *Wilson* 71. A small tree; rachis winged; leaflets usually 3 pairs, somewhat pubescent; flowers spicate, the pubescent calyx 8-13 mm.

long; pods 4-sided, 9-18 cm. long, glabrous. The species has not been recorded for the Canal Zone.

Inga punctata Willd. — Kenoyer & Standley (p. 150). Rachis not winged; leaflets 2 pairs; flowers spicate, the calyx 5 mm. long or shorter; pods flat.

Inga Roussoviana Pittier.—Kenoyer & Standley (p. 150). Rachis not winged; flowers in globose heads, short-pedicellate.

Inga spectabilis Willd. — Kenoyer & Standley (p. 150). Rachis not winged; leaflets 2 pairs, 10-20 cm. wide, coriaceous, rounded or obtuse at the apex, glabrate; pods glabrous, 4.5-7 cm. wide, very thick. In this as in many other species the seeds are surrounded by a succulent white aril that is edible and of good flavor. The pods often are offered for sale in the markets of Central America. The trees are of greatest value as coffee shade, being considered the best of all trees for the purpose.

Mimosa pudica L. SENSITIVE PLANT; DORMIDERA, CIÉRRATE, CIERRA TUS PUERTAS.—Standley (Fl. 19). Called by the West Indians "shameweed" and "shame-face." A small prickly herb with bipinnate leaves and globose heads of pink flowers. A common weed in open places. This is one of the most noted sensitive plants, the leaflets folding together immediately when the plant is disturbed, but opening again after a few minutes. The same form of movement may be observed with many other Leguminosae.

Mimosa Wilsonii, sp. nov.—Arbor, ramulis subtortuosis inermibus densissime brunneo-tomentosis; folia mediocria, petiolo 2.5-3 cm. longo supra basin vel paullo infra medium glandula subelevata onusto, rhachi 6-10 cm. longa inter paria pinnarum glandulis solitariis majusculis onusta ut petiolus dense brunneo-tomentulosa; pinnae 10-15-jugae vel plures, 3.5-5 cm. longae, subsessiles, foliolis circa 48-jugis lineari-oblongis 0.8 mm. latis obtusis basi subtruncatis et angulato-auriculatis convexis supra glabris viridibus nervulis obscuris subimpressis subtus paullo pallidioribus enerviis, costa obscura paullo excentrica, marginibus revolutis adpresso-ciliolatis; pedunculi plerumque axillares et fasciculati 1-1.5 cm. longi, tomentulosi, recti, floribus ut videtur capitatis sed vere brevissime spicatis sessilibus, capitulis staminibus neglectis fere 1 cm. diam.; calyx turbinatus 2.5 mm. longus, brunneo-sericeus,

breviter 5-dentatus, dentibus ovato-triangularibus acutis erectis; corolla calyce paullo longior, segmentis 5 acutis extus dense sericeis; stamina 10, filamentis circa 1 cm. longis.

P a n a m a : Barro Colorado Island, Canal Zone, a tree on the west shore, March 12, 1931, *C. L. Wilson* 130 (Herb. Field Mus. No. 636205, type); Barro Colorado Island, shore near Zetek House, Feb. 24, 1932, *R. H. Woodworth & P. A. Vestal* 688.

Since its fruit is unknown, the exact position of this tree is somewhat uncertain. Although it has no outstanding characters, it is quite distinct from any of the rather few *Mimosa* species recorded from Central America.

Pithecolobium Barbourianum, sp. nov.—Pl. XI.—Arbor inermis, ramulis sat gracilibus densiuscule fulvo-pilosis; folia mediocria in sicco laete viridia, petiolo crassiusculo 1-2 cm. longo densissime brunneo-piloso supra medium glandula majuscula crateriformi sessili onusto, rhachi subtereti 5-12 cm. longa dense pilosa inter paria pinnarum glandulis solitariis parvis crateriformibus onusta; pinnae 8-9-jugae, 3.5-6 cm. longae, foliolis 10-12-jugis trapezoideo-oblongis 5-10 mm. longis 3-6 mm. latis apice obtusis vel rotundatis basi valde obliquis coriaceis supra lucidissimis glabris vel tantum ad costam depressam puberulis subtus paullo pallidioribus praesertim ad costam valde elevatam pilosis, nervulis prominulis, marginibus subrevolutis adpresso-ciliatis; pedunculi axillares geminati gracillimi, 4-6 cm. longi, pilosi, floribus ut videtur capitatis sed vere breviter densissime spicatis sessilibus numerosis, capitulis fere 1 cm. diam.; calyx dentatus, 3 mm. longus, dense luteo-sericeus, breviter obtuse dentatus; corolla in alabastro dense adpresso-pilosa; cetera ignota.

P a n a m a : Zetek Trail, Barro Colorado Island, Canal Zone, October 27, 1931; *Otis Shattuck* 237 (Herb. Field Mus. No. 647693, type).

The species belongs to the group maintained by Britton and Rose as a separate genus, *Cojoba*. In their key to the species of that group the Panama tree runs at once to *Cojoba Tuerckheimii*, a Guatemalan species which differs in nearly every detail.

This new tree is named for Dr. Thomas Barbour, to whose continued interest many naturalists are deeply indebted for

the opportunities they have had for work in a locality so fascinating as Barro Colorado Island.

Pithecolobium rufescens (Benth.) Pittier. — Kenoyer & Standley (p. 150). A small unarmed tree or shrub; leaves once-pinnate, like those of *Inga*, the leaflets 3-4 pairs; flowers in dense globose heads; pods slender, elongate, twisted, bright red.

CAESALPINIEAE

Bauhinia excisa (Griseb.) Hemsl. BEJUCO DE MONO. — Standley (Fl. 19). A large woody vine; leaves deeply bilobate, the lobes acute; flowers racemose; pods flat, dehiscent. The stems are compressed and ribbon-like and perforated with large holes, as in some other members of the genus.

Bauhinia purpurea L.—Planted at the laboratory, *Shattuck* 176. Native of the Old World; a handsome ornamental shrub with large and showy, pink or white flowers.

Bauhinia sp.—Standley (Fl. 19). Frequent, apparently, but thus far only sterile specimens have been obtained; leaflets 2, densely sericeous beneath, acute.

Cassia bacillaris L.—Standley (Fl. 19). A shrub, often subscandent; leaflets 2 pairs, large, oblique at the base, glabrous or nearly so; flowers large, pale buff, the deciduous bracts small and inconspicuous; pods terete. A showy and handsome plant because of its brilliantly colored flowers.

Cassia Hayesiana (Britt. & Rose) Standley, comb. nov. (*Chamaefistula Hayesiana* Britton & Rose in N. Amer. Fl. 23:235. 1930.)—Zetek Trail, *Shattuck* 513. Similar to *C. bacillaris*, but the flowers smaller, and the leaflets densely and finely appressed-pilose beneath. It is doubtful whether this form, like the numerous other species of *Chamaefistula* described from Panama by its authors, is more than a variety or casual variant of *C. bacillaris*. Besides *C. bacillaris*, five segregates from it are listed for the region of the Zone by Britton and Rose. It may be stated with all confidence that so many members of the group do not exist there.

Cassia reticulata Willd. LAUREÑO. — Kenoyer & Standley (p. 150). A shrub or small tree; leaflets oblong, 9-12 pairs, densely pubescent; pods thin and flat. An exceptionally showy plant when covered with the large flowers. These have bright

yellow petals and orange sepals and bracts. The leaflets fold together in the evening, and remain so until sunrise.

Cassia Tora L.—Kenoyer & Standley (p. 150). An erect herb; leaflets 3 pairs; pods long and slender, only 2.5 mm. wide. A frequent weed in Panama. Called by the West Indians "dandelion" and "white broom."

Cassia undulata Benth. — Without locality, *Bailey* 377; shore near Chapman Trail, *Wilson* 81; shore line near plantation, *Wilson* 55. A shrub or small tree, similar to *C. bacillaris*; leaflets not very oblique, lustrous on the upper surface, green beneath; flowers greenish yellow, the bracts large, green, persistent.

Hymenaea Courbaril L. ALGARROBO. — Gross Point, *Shattuck* 794. A small tree; leaflets 2, asymmetric, acute, coriaceous, 5-10 cm. long; flowers large, whitish or purplish, in small terminal panicles; pods oblong, 10 cm. long, with thick hard valves, commonly 2-seeded. The tree has been supposed heretofore to be confined to the Pacific slope of the isthmus. A pale yellow or reddish gum that often exudes from the trunk is employed in making varnish, as well as for incense and other purposes. The sweet, mealy pulp surrounding the seeds is edible.

Peltogyne purpurea Pittier. NAZARENO, MORADO.—Standley (Fl. 19). A large tree of the forest; leaflets 2, acuminate, glabrous; pods semiorbicular, 3 cm. long, 1-seeded. The heartwood is of a handsome purple color.

Peltophorum sp.?—Without locality, *Woodworth & Vestal* 743. A pod found on the ground. It belongs to some tree not listed elsewhere in this report.

Prioria copaifera Griseb. CATIVO, AMANSA MUJER.—Standley (Fl. 19). Common. A tall forest tree; leaflets 4, large, acuminate, glabrous; flowers small, without petals, disposed in paniced racemes; pods 1-seeded, flat, brown, about 8 cm. long and nearly as broad. The pods are said to be a favorite food of peccaries.

Swartzia darienensis Pittier. NARANJILLO. — A glabrous shrub or small tree; leaflets usually 1-3, the petiole more or less winged; racemes few-flowered, the flowers with a single large yellow petal; pods terete or turgid, commonly 1-seeded, 2 cm. or less in diameter, red or yellow. Reported for Barro Colo-

rado in the first list (Standl. Fl. 19) under the name *Tounatea simplex* (Swartz) Taub. It is somewhat doubtful whether the Panama shrub is really distinct from that West Indian species. At any rate, the seven segregates described from Panama by Britton and Rose have slight taxonomic interest, since they appear to represent individual variations of no systematic importance.

PAPILIONATAE

Aeschynomene americana L. PEGA-PEGA. — Standley (Fl. 20). An erect, more or less hirsute herb; leaflets acute, very numerous; flowers small, buff or dull dark red; pods 2 cm. long, narrow, deeply notched along the lower edge. A common weed of Central America.

Aeschynomene hispida Swartz. — Without locality, *Bailey* 763. Leaflets obtuse; stems hirsute; fruit thick, with almost straight margins, densely hirsute. Growing, like the following species, normally in very wet soil.

Aeschynomene sensitiva Swartz.—Standley (Fl. 20). Similar to *A. hispida*, but the stems and fruit glabrous or nearly so.

Andira inermis HBK. CABBAGE-BARK; COCÚ. — Standley (Fl. 20). A large forest tree; leaflets 7-13, oblong, acuminate, glabrous; flowers purple, 1-1.5 cm. long, in dense terminal panicles; fruit subglobose, woody, 2-4 cm. in diameter, 1-seeded. One of the common trees of Central America, valued for its strong and durable wood. The drupelike fruits are distinctive.

Cajanus bicolor DC. PIGEON PEA; GUANDÚ, FRIJOL DE PALO.—Standley (Fl. 20). A grayish shrub; leaflets 3, elliptic or oblong, acute, finely pubescent beneath; flowers large, red and yellow, in stalked axillary racemes. Probably a native of tropical Asia; grown commonly in Panama for its edible seeds, and also naturalized. Called "goongo pea" by the West Indians.

Calopogonium coeruleum Benth.—Shore north of laboratory, *Woodworth & Vestal* 355; end of Gross Trail, *Woodworth & Vestal* 443; shore east of laboratory, *Woodworth & Vestal* 398; shore east of Miller Trail, *Woodworth & Vestal* 654. A large, suffrutescent vine, densely pubescent; leaflets 3; flowers bright purple or violet, the racemes longer than the

leaves; pods linear, compressed, 5-8 mm. wide, velvety-pubescent.

Canavalia panamensis Piper.—Along shore, *Bailey* 290; shore near end of Chapman Trail, *Wilson* 77; Gross Point, *Shattuck* 427; without locality, *Shattuck* 628. A large vine; leaflets 3; flowers white or pink, in stalked, axillary racemes; pods large, oblong.

Centrosema pubescens Benth. (*Bradburya pubescens* Kuntze). CAMPANILLA, CARACUCHA.—Shore, Barbour Point, *Wetmore & Abbe* 157. A slender herbaceous vine; leaflets 3, elliptic or ovate; flowers purple or whitish with purple stripes, 3 cm. long; upper calyx lobes about equaling the tube; bracts densely sericeous.

Centrosema virginiana (L.) Benth.—Shore south of Barbour Trail, *Woodworth & Vestal* 500; shore east of laboratory, *Woodworth & Vestal* 716. Similar to the preceding; upper calyx lobes much longer than the tube; bracts puberulent. The species is new for the Canal Zone flora.

Clitoria arborescens Ait.—Standley (Fl. 20). In forest. Plants woody, erect or scandent; leaflets 3, acuminate; standard petal very large and broad, bright pink, 7 cm. long. This is one of the most beautiful of all Central American plants because of the exquisite coloring of its large blossoms.

Clitoria rubiginosa Juss. — Shore north of Zetek House, *Woodworth & Vestal* 693. An herbaceous vine; leaflets 3, oval or elliptic, densely pubescent beneath; flowers creamy white with purple markings, 4 cm. long.

Dalbergia Brownei (Jacq.) Urban.—Without locality, *Bailey* 260; shore near Orchid Island, *Wilson* 99. A shrub or small tree; leaflet 1, ovate, glabrous beneath; flowers small, whitish, in axillary clusters; pods flat, 1-3-seeded.

Dalbergia Ecastophyllum (L.) Taub.—Kenoyer & Standley (p. 150). Marshes along the lake shore. Similar to the preceding; leaflets minutely sericeous beneath; pods all 1-seeded. This species grows most commonly on seashores.

Desmodium adscendens (Swartz) DC. (*Meibomia adscendens* Kuntze).—Standley (Fl. 20). A frequent weed. A low erect herb; leaflets small and broad, rounded at the apex; pods straight along the upper edge, with several joints.

Desmodium asperum (Poir.) Desv.—Edge of laboratory clearing, *Starry* 307. An erect herb; leaflets 3, as in other species listed here; flowers small, pink, racemose; pods narrow, jointed, flat, equally notched along both edges, 2 mm. wide.

Desmodium axillare (Swartz) DC. (*Meibomia axillaris* Kuntze).—Standley (Fl. 20). Leaflets obtuse or acute; plants trailing and rooting at the nodes; pods straight along the upper edge, with usually 2 joints.

Desmodium cajanifolium (HBK.) DC. PEGA-PEGA.—Called by the West Indians “strong-back” and “strong-bark.” Plants erect; pods notched more deeply along the lower than on the upper edge, not twisted, sessile or nearly so.

Desmodium frutescens (Jacq.) Schindler (*Meibomia cana* [Gmel.] Blake). PEGA-PEGA, PEGADERA.—Standley (Fl. 20). Frequent in open places. Leaflets oblong to ovate, usually acute, grayish and appressed-pilose beneath; pods with several joints, straight on the upper edge, not twisted. One of the most abundant weeds of Central America.

Desmodium purpureum (Mill.) Fawc. & Rendle (*Meibomia purpurea* Vail).—Standley (Fl. 20). An erect, perennial herb; leaflets ovate or oblong, obtuse; pods equally notched along both edges, 3 mm. wide or broader.

Desmodium Scorpiurus (Swartz) Desv. (*Meibomia Scorpiurus* Kuntze).—Standley (Fl. 20). Open places. Plants procumbent, forming dense mats; leaflets oblong to ovate, rounded at the apex; pods linear, the narrow joints 3 times as long as wide. One of the most common of tropical American weeds, nearly always to be found about dwellings.

Desmodium triflorum (L.) DC. — Laboratory clearing, *Shattuck* 195. A very small, creeping plant, somewhat suggestive in its habit of white clover; leaflets rounded, 5 mm. long; flowers small, pale purple, fascicled in the leaf axils. A common dooryard weed.

Dioclea guianensis Benth. HABA DE MONTE.—West shore, *Wilson* 123, 128; Zetek Trail, *Shattuck* 255; shore west of laboratory, *Wetmore & Abbe* 61; shore west of Salud Point, *Woodworth & Vestal* 416; shore southwest of Salud Point, *Woodworth & Vestal* 726. A large woody vine; leaflets 3,

densely pubescent beneath; flowers in stalked racemes, large and showy, purple; pods 1.5 cm. wide.

Dioclea reflexa Hook.—Standley (Fl. 20). A large, woody vine; leaflets glabrate; pods 5 cm. wide or broader.

Diphysa robinoides Benth. MACANO, CACIQUE. — Armour Trail, *Shattuck* 869. A medium-sized tree; leaflets 11-21, elliptic, 2.5 cm. long, rounded at the apex, glabrous; flowers bright yellow, 1.5 cm. long, in short racemes; pods membranous and inflated, about 6 cm. long and 1.5-2 cm. wide. The hard, heavy, fine-grained, yellow wood is valued for construction purposes.

Dipteryx panamensis (Pittier) Hubbard & Rehder (*Coumarouna panamensis* Pittier). ALMENDRO.—Standley (Fl. 20). A common tall tree; leaflets 5-8 pairs, large, oblong, the costa close to the margin; flowers pink, in large panicles; pods ellipsoid, 6 cm. long, 3.5 cm. wide, 1-seeded. The fresh pods are filled with an oily, fragrant liquid that crystallizes as the fruits dry. The seeds sometimes are roasted and the kernels eaten. This Panama tree is closely related to one in South America producing tonka beans, which contain a principle, cumarin, from which perfumes are made.

Erythrina glauca Willd. GALLITO, PITO, PALO BOBO, PALO SANTO.—Kenoyer & Standley (p. 150). In clearing at Barbour Navigation Signal. A tall tree; leaflets 3, coriaceous, rounded or very obtuse at the apex; flowers orange, the broad standard 5 cm. wide, long-clawed. In some parts of the Zone this tree forms large pure stands in the swamps, and is often planted for shade. The leaflets assume a vertical position in the evening.

Erythrina panamensis Standl. GALLITO.—Standley (Fl. 20). A shrub or small tree, the branches armed with prickles; leaflets thin, acute or acuminate; flowers bright red, the sessile, scimitar-like standard 1.5 cm. wide or less; seeds bright red. Occasional in the forest.

Indigofera mucronata Spreng.—Without locality, *Shattuck* 562. A slender herb, sometimes clambering; leaflets 5, oblong, thin, green, 1-3 cm. long, the pubescence of pale appressed hairs attached by their middle; flowers racemose, small, dull red; pods slender, linear, 2.5 cm. long. A common tropical weed.

Lonchocarpus velutinus Benth. — Without locality, *Woodworth & Vestal* 712; Fairchild Point, *Shattuck* 788. A small tree with pinnate leaves, the leaflets opposite, velvety-pubescent beneath; flowers showy, purple; pods compressed.

Machaerium marginatum Standl.—Standley (Fl. 20). Usually an erect shrub; leaflets 5, alternate, coriaceous, shining, oblong or elliptic-oblong, acuminate, chiefly 4-6 cm. wide; flowers purple, in dense panicles.

Machaerium microphyllum (Meyer) Standl.—Standley (Fl. 20). A scandent prickly shrub or a small, erect tree; leaflets 20 pairs or more, oblong, rounded at the apex, 8-12 mm. long, glabrous; flowers purple.

Machaerium purpurascens Pittier.—Standley (Fl. 20). A large vine; leaflets 10-12 pairs, rounded at the apex, 1.5-4.5 cm. long, pilose beneath.

Machaerium Seemanni Benth.—Standley (Fl. 20). Leaflets about 5 pairs, ovate or lanceolate, acuminate, ciliate, 1.5-3 cm. wide.

Machaerium Woodworthii, sp. nov.—Pl. XII. — Arbor inermis, ramulis subtortuosis sparse strigillosis; stipulae subpersistentes, 4-5 mm. longae, incrassatae, anguste triangulares, attenuatae, erectae, extus dense strigillosae; folia alterna, petiolo 3-3.5 cm. longo gracili sericeo, rhachi 5-7 cm. longa, petiolulis 2-3 mm. longis hirtellis; foliola circa 9, ovali-oblonga vel ovalia, terminale ovali-obovatum, 3.5-6.5 cm. longa, 2-3.8 cm. lata, apice late rotundata vel interdum obtusa, basi rotundata vel obtusa, crasse membranacea, supra viridia, glabra, costa subimpressa, subtus paullo pallidiora, sparse et minutissime strigilloso-sericea vel glabrata, nervis lateralibus utroque latere circa 10 angulo semirecto adscendentibus prominentibus gracilibus fere rectis marginem attingentibus; paniculae axillares, solitariae vel fasciculatae, dense floribundae, sessiles vel breviter pedunculatae, usque ad 9 cm. longae, rhachi dense brunneo-sericea, floribus sessilibus vel brevissime pedicellatis, bracteolis minutis ovato-rotundatis sericeis; calyx 4 mm. longus, campanulatus, basi obtusus, extus dense brunneo-sericeus, brevissime dentatus, dentibus subaequalibus latissimis obtusis vel rotundatis; vexillum 7 mm. longum, dorso sparse minute sericeum, alis fere aequilongis glabris; stamina monadelphica, vagina calyce fere duplo longiore; ovarium longi-

uscula stipitatum, dense brunneo-sericeum, acutum, stylo glabro 1 mm. longo et ultra.

P a n a m a : Barro Colorado Island, Canal Zone, shore west of Point Salud, February 5, 1932, *R. H. Woodworth & P. A. Vestal* 422 (Herb. Field Mus. No. 651860, type). "Flowers white with purple throat."

Mucuna rostrata Benth.—West shore, *Wilson* 136; island off Gross Point, *Shattuck* 489; Donato Trail, *Wetmore & Abbe* 12. A large, more or less woody vine, climbing over trees; leaflets 3, large and thin, acuminate, thinly strigose beneath; racemes short-stalked; flowers yellow, 7 cm. long, the standard longer than broad; keel thickened and incurved at the tip; pods large and thick, covered with stiff hairs. The hairs of the pods penetrate the flesh easily, causing intense irritation.

Mucuna urens (L.) DC. CHOCHO. — Standley (Fl. 20). Leaflets glabrous or nearly so; flowers 5 cm. long, the standard broader than long.

Phaseolus peduncularis HBK.—Standley (Fl. 20). A slender, herbaceous vine; leaflets 3, acuminate; racemes few-flowered, long-stalked, the small flowers purple.

Phaseolus vulgaris L. BEAN; FRIJOL.—Standley (Fl. 20). Planted at the laboratory. A native of tropical America.

Platymiscium polystachyum Benth. QUIRA.—Standley (Fl. 20). A large forest tree; leaves opposite, pinnate, the leaflets opposite, thin, large, acuminate, glabrous; flowers small, yellow, in racemes on old wood; pods oblong, 1-seeded, 3 cm. wide, thin. The wood is highly valued for construction and cabinet work.

Platypodium Maxonianum Pittier. CARCUERA. — Standley (Fl. 20). A tall tree; leaves pinnate, the leaflets alternate, oblong, 6 cm. long, almost glabrous; fruit samara-like, 1-seeded, swollen over the seed, decurrent below into a broad, thin wing. Easily recognized by the fruits, which may be found on the ground.

Pterocarpus Hayesii Benth. BLOODWOOD.—Kenoyer & Standley (p. 150). A tall forest tree of frequent occurrence; leaflets 9-12, pubescent; flowers yellow, in terminal or axillary racemes or panicles; fruits samara-like, pale, 6-7.5 cm. broad, 1-seeded, surrounded by a broad thin wing. This has been reported erroneously from the island (Standley, Fl. 20) as *P. officinalis* L.

Rhynchosia pyramidalis (Lam.) Urban.—Standley (Fl. 20). An herbaceous vine; leaflets 3, dotted beneath with conspicuous glands; flowers small, dull yellow, in long racemes; pods 2-seeded, constricted between the seeds, these black and scarlet. Immediately recognizable by its handsome seeds, which sometimes are employed for making bracelets and necklaces.

Vigna repens (L.) Kuntze. — Without locality, *Bailey* 299. A slender herbaceous vine, the stems glabrous or nearly so; leaflets 3; flowers pale yellow, 1.5 cm. long or shorter, the racemes long-stalked, with rather numerous flowers; pods linear and nearly terete.

Vigna vexillata (L.) Rich.—Kenoyer & Standley (p. 150). Growing in marshes. Stems densely long-pilose; flowers usually 4 or fewer in the raceme, the corolla 2-2.5 cm. long.

ERYTHROXYLACEAE

Erythroxylon amplum Benth.—Standley (Fl. 20). A glabrous shrub; leaves alternate, acute, entire, 5-8 cm. wide, short-petioled; flowers small, white, clustered in the leaf axils; fruit a small drupe.

Erythroxylon panamense Turcz.—Standley (Fl. 20). Leaves 2-3 cm. wide, thin. This species is rather similar to the Andean *E. coca*, from whose leaves cocaine is obtained.

RUTACEAE

Citrus aurantifolia (Christm.) Swingle. LIME; LIMÓN. — Standley (Fl. 21). Naturalized at some places on the island. A native of the Old World, like other species of the genus.

Citrus medica L. CITRON; TORONJA, CIDRA.—Planted at the laboratory.

Citrus sinensis (L.) Osbeck. SWEET ORANGE; NARANJA.—Standley (Fl. 21). Planted at the laboratory.

Zanthoxylum microcarpum Griseb. — Kenoyer & Standley (p. 151). A tall tree, armed with prickles; leaves pinnate, with numerous leaflets, the pubescence of fine, stellate hairs (simple in other species); flowers small, greenish, inconspicuous.

Zanthoxylum panamense P. Wilson. ARCABÚ, ACABÚ, AL-CABÚ.—Standley (Fl. 21). A large tree, the trunk covered

with large, pyramidal, corky prickles; leaflets glabrous or nearly so. Frequent in the forest. The prickles are easily detached, and since they are composed of fine-grained wood, they sometimes are carved on the basal surface and used for stamping letters or designs on paper or cloth.

Zanthoxylum setulosum P. Wilson.—Kenoyer & Standley (p. 151). Resembling the last species, but the leaflets copiously pubescent beneath.

SIMAROUBACEAE

Picramnia latifolia Tulasne.—In front of Redwood House, Armour Trail, *Wetmore & Abbe* 193; shore of Peña Blanca, *Woodworth & Vestal* 676. A small, slender forest tree; leaves pinnate, the leaflets alternate, elliptic-ovate; flowers small, white, in long, slender, pendent spikes; fruit a red drupe.

Quassia amara L. QUASSIA; GUAVITO AMARGO, PUESILDE, CRUCETA.—Standley (Fl. 21). A shrub or small tree; leaves pinnate, the rachis broadly winged, the leaflets opposite; flowers 3 cm. long, bright red, in large racemes. All parts of the plant are as bitter as quinine, the flavor resulting from a principle, quassin, that formerly was believed to be of value as a febrifuge. The shrub furnishes the quassia or bitterwood of commerce, employed in the manufacture of insecticides and various proprietary medicines. The handsome red flowers are conspicuous in the deep forest where the plant usually grows.

Simarouba glauca DC. ACEITUNO.—Wheeler Trail, *Starry* 144. A medium-sized tree; leaves pinnate, the 11-21 leaflets oblong, thick, glabrous or nearly so, pale beneath; flowers small, greenish, in large panicles; fruit black or pinkish, 1.5-2 cm. long, resembling an olive. The genus and species are new for the flora of the Canal Zone. The white flesh of the fruit is juicy and edible, but too insipid to win favor.

BURSERACEAE

Bursera Simaruba (L.) Sarg. (*Elaphrium Simaruba* Rose). ALMÁCIGO, CARATE; called "gumbo-limbo" in Florida.—Peña Blanca, *Shattuck* 498; shore north of Fuertes House, *Woodworth & Vestal* 741. Usually a small tree, glabrous or nearly so, with aromatic sap; leaves pinnate, the leaflets entire, ovate

or elliptic, acuminate; flowers small, whitish; fruit small, dry, dehiscent. The tree is easily recognized by its bark, which peels off in thin, papery sheets, leaving the trunk smooth and greenish. In some parts of Central America the tree receives the descriptive name of "indio desnudo" (naked Indian), alluding to the fact that, as seen in a dark forest, the coppery color of the old trunks has a startling resemblance to the bodies of the native people of aboriginal blood. Some of the species of *Bursera* are the source of copal, from which varnish is made.

Protium asperum Standley in Trop. Woods, 8:4 (1926). CARAÑO.—Type collected on Barro Colorado, *Standley* 41161. The tree was not collected again until recently: Snyder-Molino Trail, *Shattuck* 769, probably from the type tree. A tree 20 meters high; leaves pinnate, the 13 leaflets oblong, acuminate, entire, very scabrous on both surfaces; flowers paniculate; fruit 1 cm. long, indehiscent. From wounds on the trunk there exude large quantities of a fragrant balsam having a penetrating, agreeable, and distinctive odor. A large pool of this balsam was present at the base of the thick trunk when the type material was collected. I was told by a guide that this balsam was gathered for market in some places in the region, probably for use as incense. The species has not been found elsewhere than on Barro Colorado Island.

Protium panamense (Rose) I. M. Johnston. COPÁ (evidently a corruption of the Aztec "copal").—Kenoyer & Standley (p. 151). A large tree; leaves glabrous or nearly so, smooth; flowers pedicellate.

Protium Salvozae Standley in Jour. Arnold Arb. 11:122 (1930).—Type collected on Barro Colorado between Drayton and Armour cabins, *W. N. Bangham* 513; shore of cove west of Drayton House, *Woodworth & Vestal* 605. A small tree 4-8 meters high; leaflets 5-7, hirtellous along the veins; flowers sessile, in simple spikes; fruit red, 1.5 cm. long. Known only from Barro Colorado.

Protium sessiliflorum (Rose) Standl. ANIME. — Standley (Fl. 21). A large forest tree, common; leaflets glabrous and smooth; flowers sessile.

Tetragastris panamensis (Engler) Kuntze.—Standley (Fl. 21). A large forest tree; leaves pinnate, the leaflets lance-oblong; fruit indehiscent, 3-lobed, 2 cm. in diameter.

MELIACEAE

Guarea guara (Jacq.) P. Wilson. CEDRO MACHO.—Laboratory clearing, *Woodworth & Vestal* 747. A medium-sized tree; leaves pinnate, the 8-20 leaflets opposite, oblong, 10-20 cm. long; flowers inconspicuous, in small panicles; fruit a globose-obovoid capsule 3 cm. in diameter.

Trichilia tuberculata (Triana & Planch.) C. DC. ALFAJE.—Standley (Suppl. 123). A tree 7 meters high or more; leaflets 5-7; flowers in elongate panicles.

MALPIGHIACEAE

Banisteria cornifolia (HBK.) Spreng.—Shore near end of Fairchild Trail, *Wetmore & Abbe* 63; Fairchild Point, *Shattuck* 645. A large woody vine; leaves short-petiolate, opposite, elliptic to lanceolate, sparsely strigose beneath, coriaceous; flowers small, yellow, in axillary racemes or corymbs; sepals with large dorsal glands (as in many other plants of the family); fruit of large samaras resembling those of the Maple. The species is new to the Canal Zone flora.

Bunchosia cornifolia HBK.—Kenoyer & Standley (p. 151). A shrub; leaves short-petioled, broad, elliptic to ovate, densely strigose beneath; ovary pubescent; flowers yellow, in axillary racemes or panicles; fruit drupaceous, juicy, red.

Bunchosia nitida (Jacq.) DC.—Standley (Suppl. 123). A shrub 2 meters high; leaves elliptic to lanceolate, glabrous, at least in age; ovary glabrous; fruit 1.5 cm. in diameter. The species is known in the Canal Zone only from Barro Colorado Island.

Byrsonima coriacea (Swartz) Kunth. NANCE. — Wheeler Trail, *Starry* 129. A shrub or small tree; leaves oblong or elliptic, glabrous or nearly so; fruit a drupe 1 cm. in diameter. The species is an addition to the known flora of Central America.

Byrsonima crassifolia (L.) DC. NANCE.—Kenoyer & Standley (p. 151). A small tree; leaves mostly obovate, densely grayish or brownish tomentose beneath; flowers in terminal racemes, the showy petals bright yellow, turning reddish as they wither; fruit a globose, yellow drupe 1 cm. in diameter. The ripe fruits are edible, with a flavor somewhat suggestive of

green apples. They are eaten mostly by children and birds, but sometimes they are offered for sale in the Central American markets. In the drier parts of the Pacific slope this species often forms extensive thickets of distinctive aspect. The trees are conspicuous when loaded with their handsome golden blossoms.

Hiraea fagifolia (DC.) Juss.—Standley (Fl. 21). A woody vine; leaves acuminate, glabrous or nearly so; wings of the fruit membranous.

Hiraea faginea (Swartz) Niedenzu.—Kenoyer & Standley (p. 151). A climbing shrub; leaves acuminate, densely sericeous beneath with lustrous hairs; flowers yellow; fruit of samaras, the wings coriaceous. This is No. 1 on page 228 of the FLORA OF THE CANAL ZONE. Through an error the name is printed there as "*H. fagifolia* (Swartz) Niedenzu."

Hiraea obovata Niedenzu.—Without locality, *Aviles*. Leaves obovate, usually rounded at the apex.

Hiraea smilacina, sp. nov.—Pl. XIII. — Frutex scandens, ramis crassis teretibus brunneis plus minusve rimosis lenticellis paucis parvis elevatis pallidis notatis ad nodos strigosis; folia magna, breviter petiolata, firme membranacea, petiolo crasso 1.5-2 cm. longo strigoso; lamina oblongo-elliptica, circa 17 cm. longa et 9 cm. lata, abrupte cuspidato-acuminata acumine longe anguste attenuato fere 2 cm. longo, basi anguste rotundata vel subemarginata, supra in sicco fusca, tantum ad costam pilosa aliter glabra, nervis manifestis sed vix prominentibus, subtus pilis laxis albis intertextis induta, costa gracili elevata, nervis lateralibus utroque latere circa 9 angulo semirecto adscendentibus; pedunculi axillares solitarii, circa 4.5 cm. longi, ut videtur recurvi, validi, dense strigosi, floribus numerosis umbellatis, pedicellis crassiusculis 1.5-2 cm. longis strigosis patentibus vel saepe subcurvis, bracteis apice pedunculi dense congestis oblongis dense pilosis 3 mm. longis; sepala eglandulosa, 2-2.5 mm. longa, anguste triangularia, acuta, dense albido-strigosa, erecta; petala lutea, glabra, longe unguiculata ungue gracili 3 mm. longo, limbo rotundato vel subquadrato cochleari 4 mm. longo subintegro, quinti prope apicem profunde laciniato.

P a n a m a : Barro Colorado Island, Canal Zone, June 27, 1931, *L. H. & Ethel Zoe Bailey* 403 (Herb. Field Mus. No.

643070, type); Barro Colorado Island, cove west of Fuertes House, Feb. 22, 1932, *R. H. Woodworth & P. A. Vestal* 661.

Related to *H. multiradiata* Juss., of French Guiana and Colombia, but differing in several details from Niedenzu's description of that species. Among the Central American species of *Hiraea* the present plant may be recognized at once by its simple umbels, strongly suggestive of those of the genus *Smilax*.

Malpighia glabra L.—Zetek Trail, *Shattuck* 511. A shrub or small tree; leaves elliptic, acute, glabrate; flowers pale red, in sessile cymes; fruit a globose red drupe. The species is new to the flora of the Canal Zone. The intensely acid fruits are edible.

Spachea elegans (F. W. Meyer) Juss.—Standley (Suppl. 123). Near Pearson Trail, *Bangham* 579; *Salvoza* 1000; unknown elsewhere on the North American continent. A tree 8 meters high; leaves acute, glabrate; flowers in long racemes; fruit a small nutlike capsule.

Stigmaphyllon ellipticum (HBK.) Juss.—Kenoyer & Standley (p. 151). A small woody vine; leaves small, glabrous or nearly so, without marginal glands.

Stigmaphyllon Humboldtianum Juss.—Standley (Fl. 21). A woody vine; leaves broad, sericeous or tomentose beneath, bearing stalked glands along the margins; flowers bright yellow, showy; fruit of 3 large samaras.

Stigmaphyllon hypargyreum Triana & Planch. — Standley (Suppl. 123). Leaves without marginal glands, densely covered beneath with silvery shining hairs.

Tetrapteris Seemanni Triana & Planch.—Shore east of Barbour Point, *Wilson* 149; end of Miller Trail, *Starry* 285; clearing around Bangs House, end of Chapman Trail, *Wetmore & Abbe* 186; shore north of Zetek House, *Woodworth & Vestal* 695. A large woody vine; leaves glabrous; flowers large and showy, yellow, turning orange as they wither; fruit of 3 large samaras.

TRIGONIACEAE

Trigonia floribunda Oerst.—Standley (Fl. 21). A climbing shrub; leaves opposite, short-petioled, entire, white-tomentose beneath; flowers small, white, in terminal panicles; fruit a 3-angled capsule. This plant is not particularly rare about the Canal Zone, but it is seldom seen in flower or fruit.

VOCHYSIACEAE

Vochysia ferruginea Mart.—Standley (Suppl. 123). A small or medium-sized tree; leaves opposite, thick, oblong, 8-16 cm. long, acuminate, reddish-tomentose beneath; flowers bright yellow, in narrow panicles, one of the 3 petals spurred; fruit a 3-angled capsule 2.5 cm. long. The tree is exceptionally showy when in flower.

POLYGALACEAE

Polygala paniculata L.—Kenoyer & Standley (p. 151). A delicate annual with linear leaves; flowers minute, purple or white, in slender racemes. A rather weedy plant of wide distribution.

Securidaca coriacea Bonpl.—Shore at end of Barbour Trail, *Woodworth & Vestal* 505. A woody vine; leaves small, entire, densely velvety-pilose beneath; flowers racemose, purple or bright pink. The vines of this genus are strikingly beautiful when in blossom. In general appearance they suggest some of the Leguminosae, especially when viewed from a short distance.

Securidaca diversifolia (L.) Blake.—Standley (Fl. 21). Leaves with sparse, short, appressed hairs on the lower surface.

EUPHORBIACEAE

Acalypha diversifolia Jacq.—Standley (Fl. 21). A common shrub with slender branches; leaves alternate, crenate, lance-oblong or elliptic-oblong, 3-6 cm. wide, pubescent or glabrate beneath; flowers spicate, the pistillate spikes with staminate flowers above. One of the most abundant shrubs of Central America.

Acalypha macrostachya Jacq.—Standley (Fl. 21). Leaves broadly ovate, 10-15 cm. wide, velvety-pubescent beneath; pistillate spikes without staminate flowers.

Acalypha villosa Jacq.—Island off Gross Point, *Shattuck* 843. A shrub; leaves broadly ovate, velvety-pubescent beneath; pistillate flowers pedicellate.

Adelia triloba (Muell. Arg.) Hemsl.—Edge of new garden, *Wetmore & Abbe* 35; shore east of laboratory, *Wetmore & Abbe* 145, 153; near end of Chapman Trail, *Woodworth & Vestal* 522; near end of Barbour Trail, *Woodworth & Vestal* 510; Barbour Point, *Shattuck* 806. A shrub or small tree, the

branchlets often spinose; leaves lance-oblong to obovate, acuminate, entire, almost glabrous but barbate beneath in the axils of the veins; flowers dioecious, long-pedicellate, clustered in the leaf axils; fruit a 3-lobed capsule.

Alchornea costaricensis Pax & Hoffm.—Standley (Fl. 21). A small tree; leaves elliptic-ovate, 7-15 cm. long, acuminate, remotely crenate, almost glabrous; flowers dioecious, the staminate in very long, pendent spikes.

Codiaeum variegatum (L.) Blume.—Standley (Fl. 21). A shrub with diversely colored leaves of varying form; one of the tropical "crotons" planted at the laboratory. Native of the Pacific islands.

Croton Billbergianus Muell. Arg.—Standley (Fl. 21). A large shrub or small tree, growing usually in forest; leaves large, cordate at the base, entire, their pubescence of minute, stellate hairs; flowers in long racemes.

Croton glandulosus L.—Kenoyer & Standley (p. 151). A small, annual herb with hispid stems; leaves crenate.

Dalechampia dioscoreifolia Poepp. & Endl.—Wheeler Trail, *Wetmore & Abbe* 11. A small, herbaceous vine; leaves simple, broadly ovate-cordate, almost glabrous; flowers in long-stalked clusters, each head subtended by two broad, leaflike, pink bracts.

Dalechampia panamensis Pax & Hoffm.—Standley (Fl. 21). Leaves 3-parted, with narrow leaflets, glabrate beneath; bracts green.

Dalechampia tiliifolia Lam.—Barbour Point, *Wilson* 145; *Wetmore & Abbe* 156. Leaves merely 3-lobed, densely pubescent beneath; bracts cream-colored. This and *D. dioscoreifolia* are rather handsome plants, of curious appearance. The pistillate sepals are laciniate and covered with stiff, stinging hairs that easily penetrate the flesh.

Euphorbia brasiliensis L. GOLONDRINA.—Laboratory clearing, *Bailey* 155, 155a; near steps to the laboratory, *Woodworth & Vestal* 409. An erect annual, glabrous throughout; leaves opposite, unequal at the base, serrate; seeds black. One of the common dooryard weeds of tropical America.

Euphorbia heterophylla L.—Kenoyer & Standley (p. 151). An erect annual; leaves alternate, toothed, the uppermost more or less tinged with red. A weedy plant.

Euphorbia hirta L. HIERBA DE POLLO.—Standley (Fl. 21). Called "milkweed" by the West Indians. A low annual, copiously pubescent; leaves opposite, serrate, often blotched with dark red; involucre in axillary cymes. One of the three or four most abundant weeds of Central America.

Euphorbia hypericifolia L. HIERBA DE POLLO.—Standley (Fl. 22). An erect glabrous annual; leaves opposite, serrate; seeds red-brown.

Hieronyma alchorneoides Allem. PANTANO.—Standley (Fl. 22). A tall forest tree, frequently 30 meters high; leaves alternate, petioled, elliptic, acuminate, entire, with scattered, minute, stellate scales on both surfaces; flowers small, dioecious, in lateral panicles; fruit a 1-seeded drupe only 2-3 mm. long.

Hura crepitans L. SANDBOX; JAVILLO.—Standley (Fl. 22). A giant forest tree, the pale trunk covered with small, sharp prickles; leaves long-petioled cordate-ovate, toothed; fruit a pumpkin-shaped capsule 8-10 cm. broad, consisting of about 15 one-seeded woody cells, arranged like the sections of an orange. When ripe, the capsule explodes with a loud report, throwing the large seeds to a considerable distance. In colonial days the young fruits were dried and used as containers for the sand with which ink was blotted, hence the common name of the tree. The milky sap produces blisters upon the skin, at least with certain persons. It is employed in some regions for stupefying fish. The seeds seem to be one of the favorite foods of Central American macaws.

Mabea occidentalis Benth.—Standley (Fl. 22). A shrub or small tree with very slender branches; leaves alternate, oblong, short-petioled; flowers monoecious, in terminal raceme-like panicles, the staminate flowers being small balls of numerous stamens; fruit a 3-lobed, often red or purple capsule. The branches of the inflorescence bear large glands.

Manihot esculenta Crantz. CASSAVA; YUCA. — Standley (Fl. 22). Planted at the laboratory. Much cultivated in Panama for its large edible roots. Probably native in Brazil.

Omphalea diandra L.—Standley (Suppl. 123). A large woody vine or an arching shrub; leaves long-petioled, large, oval, the petiole bearing two conspicuous glands at its apex;

flowers monoecious, small, greenish, in broad panicles; capsule fleshy, yellow, as large as an orange.

Phyllanthus conami Swartz.—Standley (Fl. 22). A slender shrub or small tree; leaves distichous, ovate, acute, entire; flowers small and green, clustered in the leaf axils; fruit a small capsule. The distichous arrangement of the small leaves on the graceful branches is characteristic, the branches somewhat suggesting the fronds of a large fern.

Phyllanthus niruri L.—Standley (Fl. 22). Called by the West Indians "seed-on-the-leaf." A small annual, glabrous; leaves oblong, entire, 1 cm. long or less, pale; flowers minute, green.

Phyllanthus nobilis (L. f.) Muell. Arg.—Standley (Fl. 22). A glabrous shrub or small tree; leaves oblong-elliptic, acute, 8-14 cm. long; capsules 8 mm. in diameter.

Sapium aucuparium Jacq.? OLIVO, ÑIPE. — Sterile specimens collected in a ravine near the laboratory. A shrub or small tree; leaves linear-oblong or narrowly oblong, glandular-serrate; petiole with 2 stalked glands near its apex; flowers monoecious, spicate; fruit a 3-lobed capsule. From the milky latex of the tree, after it has coagulated, Panamanian boys make birdlime. The sap of some species is considered poisonous to the skin in Central America. That of some of the South American species of *Sapium* yields a commercial rubber or similar substance.

Sapium jamaicense Swartz.—Kenoyer & Standley (p. 151). A tree; leaves oblong-elliptic. Known in the Zone only from Barro Colorado.

ANACARDIACEAE

Anacardium excelsum (Bert. & Balb.) Skeels. ESPAVÉ.—Standley (Fl. 22). A giant forest tree; leaves obovate-oblong, 15-25 cm. long; flower panicles much longer than the leaves, with brown pubescence; stamens 10. One of the common forest trees of the isthmus. The fruit is somewhat like that of the following species, and edible. In some parts of Panama the crushed bark is employed as a fish poison. The soft, light brown or yellow wood is valued for many purposes.

Anacardium occidentale L. CASHEW; MARAÑÓN. — Shore near end of Chapman Trail, *Wilson* 82; shore near end of

Gross Trail, *Woodworth & Vestal* 711. A small tree; leaves oval-obovate, 10-14 cm. long; panicles little longer than the leaves, with gray pubescence, the flowers greenish white, turning red; stamens 7-8. One of the best-known fruit trees of Central America. The curious fruit consists of a large grayish kidney-shaped nut borne at the apex of a fleshy hypocarp that is colored red or yellow, and suggests by its form and size a bullnose pepper. The outer coat of the nut contains an acrid caustic oil that produces blisters on the skin. The roasted kernels are very good to eat, and in recent years they have become popular in the United States, where they are consumed in large quantities.

Astronium graveolens Jacq. ZORRO. — Standley (Fl. 22). Frequent, especially in the form of seedling plants. A tall tree; leaves pinnate, the leaflets lance-oblong, thin, coarsely serrate or almost entire; calyx much enlarged after anthesis, dry. The wood is valuable for construction and cabinet work.

Mangifera indica L. MANGO.—Standley (Fl. 22). Planted at the laboratory, and also naturalized about old settlements. Imported long ago from the Old World, and now the favorite fruit tree of Central America.

Mosquitoxylum jamaicense Krug & Urban. — Standley (Suppl. 124). A tree, growing on the lake shore; leaves pinnate, the 11-17 leaflets obovate-oblong, entire, rounded or obtuse at the apex, appressed-pilose or glabrate beneath; flowers dioecious, in large panicles; fruit a small red drupe. Called "mosquito wood" in Jamaica. Known in the Canal Zone only from Barro Colorado.

Spondias Mombin L. HOGPLUM; JOBO.—Standley (Fl. 22). A small tree; leaves pinnate, the leaflets 5-9 pairs, acuminate, glabrous or nearly so; flowers small, white, in large panicles; fruit a large drupe containing a rough stone. The fruit, yellow and somewhat suggestive of a plum in appearance and flavor, is juicy and edible.

HIPPOCRATEACEAE

Hippocratea malpighiifolia Rudge.—Shore north of Bangs House, *Woodworth & Vestal* 580; shore east of laboratory, *Woodworth & Vestal* 715. A large woody vine; leaves opposite, short-petiolate, oblong-elliptic, serrate or nearly entire, acumi-

nate, glabrous; flowers green or brown, in large, lax, almost glabrous panicles, stamens 3; petals 6-7 mm. long. As usually is the case in this genus, the specific determination is uncertain. The species has not been recorded from the Canal Zone.

The *Hippocrateas* may be recognized at once by their peculiar fruit, altogether unlike that of any other plant. It is a large capsule, deeply 3-lobed, the lobes being strongly compressed vertically and thin, splitting down the middle and exposing the several large winged seeds.

***Hippocratea volubilis* L.**—Standley (Fl. 22). A large vine, climbing on tall trees, frequent; leaves chiefly elliptic or oval, obtuse or acute, crenate-serrate or almost entire; panicles small, usually densely and finely pubescent; petals smaller. One specimen from Barro Colorado, *Wetmore & Abbe* 160, is noteworthy in having the flowers apparently deformed by insects. The flowers appear altogether unlike normal *Hippocratea* flowers, so much so that upon first examination I thought that the specimens must represent some genus altogether unknown previously in the Central American flora.

***Salacia praecelsa* (Miers) Griseb.** GARROTILLO. — Standley (Fl. 22). A large woody vine; leaves elliptic; fruit baccate, about as large as a baseball. The specific determination of the plant growing on Barro Colorado is questionable.

STAPHYLEACEAE

***Turpinia paniculata* Vent.**—Kenoyer & Standley (p. 152). Usually a small tree; leaves opposite, odd-pinnate, the 5-11 leaflets ovate to lance-oblong, crenate or entire, glabrous; flowers small, white, in terminal panicles; fruit 1-1.5 cm. in diameter, 3-celled, subglobose, indehiscent.

SAPINDACEAE

***Allophylus psilospermus* Radlk.** — Standley (Fl. 22). A shrub or small tree; leaflets 3, elliptic or ovate, thin, acuminate, glabrate, serrate or subentire; flowers small, whitish, in axillary panicles; fruit a red drupe 6 mm. long. In the first list of the Barro Colorado flora, for some unaccountable reason, the fruit is described as winged.

***Cupania cinerea* Poepp.** GORGOJERO.—Standley (Fl. 22). A shrub or small tree; leaves pinnate, the few leaflets large and

thick, whitish beneath and minutely but densely tomentose; flowers small, whitish, in large terminal panicles; fruit a 3-lobed capsule containing 3 arillate seeds. The plants of this genus are frequent shrubs in the tall forest. Young plants often have simple leaves.

Cupania fulvida Triana & Planch. CANDELILLO, GORGOJO, GORGOJERO.—Standley (Fl. 22). Stems often simple and unbranched, densely brown-hirsute; petioles and rachis densely hirsute.

Cupania latifolia Kunth.—Standley (Fl. 22). Leaflets glabrous, rounded or retuse at the apex, sinuate-crenate.

Cupania Seemanni Triana & Planch.—Standley (Fl. 22). Leaflets glabrous, acuminate, entire.

Paullinia alata Don.—Standley (Fl. 22). A woody vine with tendrils; leaves pinnate; flowers white, in dense broad clusters shorter than the petioles; fruit a large capsule, terete, not winged. All the species of *Paullinia* are employed in Central America and elsewhere as fish poisons or barbascos.

Paullinia Baileyi, sp. nov.—Pl. XIV.—Frutex scandens, ramulis profunde 6-sulcatis dense pilis rigidis patentibus 4-6 mm. longis fulvis hirsutis; folia magna, longe petiolata vel interdum fere sessilia, 5-foliolata, petiolo usque ad 16 cm. longo nudo, rhachi 3-7 cm. longa late alata hirsuta integra; foliola lateralia oblonga vel ovato-oblonga, sessilia vel inferiora breviter petiolulata, vulgo 14-17 cm. longa et 4.5-8 cm. lata, membranacea, acuminata vel longiacuminata, basi acuta vel interdum subtruncata, supra medium remote grossidentata, supra tantum ad nervos pilosa vel hirsuta, nervulis prominulis arcte reticulatis, subtus densius praesertim ad nervos hirsuta, foliolo terminali majore longius angustiusque attenuato-acuminato versus basin longe anguste attenuato; flores ad axillas dense fasciculati numerosi, pedicellis fructiferis circa 1 cm. longis gracilibus glabris; sepala 5, sub capsulam persistentia, insigniter inaequalia, glabra, obtusa, fere libera, maxima usque ad 5 mm. longa; capsula suborbicularis, 1 cm. longa et aequilata, basi et apice late rotundata vel basi interdum late cuneata, subsessilis, glabra, triolata alis latis tenuibus, mesocarpio parenchymatico alas plus minusve ingrediente sed vix bipartibili; stylus persistens, 2.5 mm. longus.

P a n a m a : Barro Colorado Island, Canal Zone, June 8,

1931, *L. H. & Ethel Zoe Bailey* 59 (Herb. Field Mus. No. 643119, type); Shannon Trail, October 19, 1931, *Shattuck* 152; Barbour-Lathrop Trail, October 12, 1931, *Shattuck* 25.

Referable to the section *Caloptilon*. Remarkable among Panama species of *Paullinia* for the abundant pubescence of exceptionally long hairs.

Paullinia bracteosa Radlk. — Standley (Fl. 22). Leaves pinnate; flowers in racemes usually as long as the leaves, the bracts much exceeding the flower clusters; fruit not winged.

Paullinia fimbriata Radlk.—Standley (Suppl. 124). Stems brown-tomentose; leaves pinnate, the few, large leaflets rounded-elliptic, almost entire, densely pubescent beneath; flowers in very short and dense, sessile racemes. Known in the Zone only from Barro Colorado.

Paullinia glomerulosa Radlk.—Standley (Fl. 22). Leaves ternate-pinnate; flower clusters shorter than the petioles; fruit winged.

Paullinia pinnata L.—Kenoyer & Standley (p. 151). Leaves pinnate, the 5 leaflets coriaceous, coarsely toothed, glabrous; racemes usually equaling the leaves, the bracts much shorter than the flower clusters; fruit a large, red or brown, terete capsule, the black seeds subtended by a fleshy white aril.

Paullinia turbacensis HBK.—Standley (Fl. 22). Leaflets only 3, broadly elliptic or ovate; fruit angled.

Paullinia Wetmorei, sp. nov. — Frutex scandens, ramulis teretibus pallide brunneis lenticellis numerosis parvis elevatis notatis, corpore lignoso simplici; folia pinnatim trifoliolata, petiolo gracillimo 4.5-9 cm. longo minute pilosulo vel glabrato, petiolulis foliorum lateralium 3-4 mm. longis, folioli terminalis 1-2 cm. longis; foliola membranacea, lateralia ovali-oblonga vel ovato-elliptica, terminale rhombeo-ovatum, 6-22 cm. longa, 4-13 cm. lata, acuta vel obtusa, basi obtusa vel rotundata et saepe abrupte decurrentia, integra vel remote undulato-dentata, supra tantum ad nervos puberula, costa nervisque elevatis, venulis arctissime reticulatis, subtus in axillis nervorum brevissime barbata aliter glabra, costa ut nervi elevata, venulis elevatis et arcte reticulatis; paniculae e nodis defoliatis nascentes, 4-5 cm. longae, dense multiflorae, sessiles, pauciramosae, ramis dense minute puberulis, bracteis minutis, floribus subsessilibus vel usque ad 3 mm. longe pedicellatis; sepala

inaequalia, 2-3 mm. longa, ovalia vel late elliptica, apice rotundata, persistentia, extus sparse minute sericea; capsula immatura 3 mm. longe stipitata, obovoideo-elliptica, acute angulata, 15 mm. longa et 7 mm. lata, apice acuta, basi acuminata sparse brevissime hirtella, stylo persistente vix 1 mm. longo terminata, parietibus tenuibus fragilibus.

P a n a m a : Barro Colorado Island, Pearson Trail, January 6, 1932, *Otis Shattuck* 689 (Herb. Field Mus. No. 651961, type); Shannon Trail, Dec. 19, 1931, *Shattuck* 609.

The species is named for Dr. R. H. Wetmore, whose collections have supplied so many new records for Barro Colorado Island.

Serjania atrolineata Sauv. & Wright.—Shore near Bangs House, *Woodworth & Vestal* 582; end of Chapman Trail, on shore, *Woodworth & Vestal* 516; shore at end of Miller Trail, *Woodworth & Vestal* 657; Miller Trail, *Shattuck* 50. A woody vine, with tendrils; leaflets twice ternate, the 9 leaflets glabrous or nearly so, entire or remotely serrate; flowers small, white, panicked; fruit of 3 samaras, the seed borne at the apex of the samara; partition walls of the fruit cells narrow, the cells lightly coherent, hirtellous, subglobose. The *Serjanias*, like the *Paullinia* species, often are employed as fish poisons.

Serjania cornigera Turcz.—Shore near laboratory, *Wilson* 8; Zetek Trail, *Shattuck* 517; shore beyond end of Fairchild Trail, *Wetmore & Abbe* 65A; shore west of boat landing, *Wetmore & Abbe* 65; cove north of laboratory, *Woodworth & Vestal* 330. A densely hairy vine; flowers larger than in other species; fruits 4-4.5 cm. long, the cells hispid with long stiff hairs.

Serjania insignis Radlk.—Near Fuertes House, *Woodworth & Vestal* 638. Leaflets 9, entire or remotely serrate, glabrous or nearly so; partition walls nearly as broad as the cells, the cells firmly united.

Serjania mexicana Willd.—Standley (Suppl. 124). Leaflets 9, entire or serrate, glabrous or nearly so; cells of the fruit lightly coherent, glabrate, strongly compressed.

Serjania trachygona Radlk. — Standley (Fl. 22). Leaves ternate-pinnate, with numerous leaflets, these small and coarsely crenate.

Talisia nervosa Radlk.—Standley (Fl. 22). A shrub or small tree, often unbranched; leaves very large; pinnate, the few leaflets lance-oblong, entire, glabrous, 30-50 cm. long; flowers small, white, in large panicles; fruit oval, brown, indehiscent, 2.5 cm. long.

Talisia Svensonii, sp. nov.—Frutex vel arbor parva, ramulis crassis teretibus plus minusve striatis, novellis dense luteo-tomentosis; folia alterna, 3-8 cm. longe petiolata, rhachi usque ad 5 cm. longa (et ultra?) ut petiolus densissime fulvo-pilosula vel serius glabrata; foliola 2-6, inaequalia, crasse membranacea, 2-6 mm. longe petiolulata, oblonga vel elliptico-oblonga, 9-18 cm. longa et 4-8 cm. lata, integra, acuta, acuminata vel sub-obtusa, basi acuta et decurrentia, supra praesertim ad nervos breviter fulvo-pilosula vel glabrata, lucida, costa nervisque prominentibus, subtus concoloria, ad costam nervosque hirtella aliter glabra vel glabrata, costa nervisque elevatis, venulis elevatis atque arcte reticulatis; paniculae axillares vel extra-axillares solitariae vel fasciculatae, simplices et spiciformes vel interdum pauciramosae, usque ad 8 cm. longae, rhachibus dense fulvo-tomentosis, floribus dense aggregatis 1-2 mm. longe pedicellatis, bracteis minutis; sepala oblongo-elliptica, obtusa, 2.5 mm. longa, dense fulvo-tomentosa; petala alba, sepalis subaequilonga, intus dense villosa-pilosa; stamina sepalis longiora, filamentis dense albo-villosis.

P a n a m a : Barro Colorado Island, shore north of the laboratory, Feb. 2, 1932, *R. H. Woodworth & P. A. Vestal* 353 (Herb. Field Mus. No. 651882, type); shore of cove south of French Lock site, *Woodworth & Vestal* 459; Barro Colorado Island, April 23, 1930, *H. K. Svenson* 425.

RHAMNACEAE

Colubrina rufa Reissek. — Shore west of Barbour Point, *Wetmore & Abbe* 165; shore north of Bangs House, *Woodworth & Vestal* 588; shore near end of Chapman Trail, *Woodworth & Vestal* 540. A small tree; leaves oblong-ovate to elliptic, entire, the blades with 2 glands near the base; pubescence rust-colored; flowers small, green, in peduncled cymes; fruit a small 3-celled capsule.

Gouania lupuloides (L.) Urban. — Standley (Fl. 23). A woody vine or an arching shrub, with tendrils; leaves alter-

nate, elliptic, crenate, nearly glabrous beneath; flowers small, white, in long racemes; fruit small and dry, with broad longitudinal wings. Called "chewstick" in Jamaica. The wood has been employed abroad in making dentifrices. It produces an abundant lather when macerated in water.

Gouania polygama (Jacq.) Urban. JABONCILLO.—Standley (Fl. 23). Leaves densely pubescent beneath.

VITACEAE

Cissus rhombifolia Vahl.—Kenoyer & Standley (p. 152). A woody vine; leaves with 3 leaflets, these acuminate, villous, at least beneath; flowers small, red, in cymes; fruit a small, inedible berry.

Cissus salutaris HBK.—Standley (Fl. 23). Leaflets 3, obtuse or rounded at the apex, glabrous or practically so; flowers bright red and showy.

Cissus sicyoides L.—Standley (Fl. 23). A large vine with tough, flexible stems; leaves simple, broadly ovate, serrate, rounded to deeply cordate at the base; flowers green. One of the common and more or less weedy plants of Central America. The sap is said to cause irritation of the skin, and even blisters.

TILIACEAE

As here treated, this family includes the group sometimes separated under the name ELAEOCARPACEAE.

Apeiba aspera Aubl.—Standley (Fl. 23). A medium-sized tree; leaves alternate, short-petioled, oblong or ovate, usually rounded at the base, entire or nearly so, glabrate above, minutely and densely tomentose beneath; flowers yellow, in small cymes; fruit dry, depressed-globose, covered with flexible spines, in appearance strongly suggesting a sea urchin.

Apeiba tibourbou Aubl. PEINE DE MICO ("monkey-comb"), CORTEZO, CORTEZ.—Standley (Fl. 23). Leaves cordate at the base, finely dentate; leaves stellate-tomentose. One of the common trees of Central America.

Belotia panamensis Pittier.—Standley (Fl. 23). A medium-sized tree; leaves short-petioled, oblong-lanceolate, long-acuminate, 3-nerved, finely serrate, stellate-pubescent beneath; flowers in small cymes, about 3 cm. broad, with violet petals and pink sepals; capsule 2-celled, compressed, broadly obcordate.

When in flower the tree is exceptionally showy and handsome.

Corchorus orinocensis HBK.—Without locality, *Aviles* 12. An erect herb; leaves small, acuminate, serrate; flowers small, yellow; fruit a linear capsule. A weedy plant, related to the species furnishing the jute of commerce.

Heliocarpus popayanensis HBK. MAJAGÜILLO. — Standley (Fl. 23). A medium-sized tree; leaves long-petioled, rounded-ovate, dentate and often lobed, finely stellate-pubescent beneath; flowers small, pale yellow; fruit small, dry, compressed, the margins bearing long, hairy bristles.

Luehea Seemannii Triana & Planch. GUÁCIMO. — Standley (Fl. 23). Leaves finely serrate, covered beneath with a fine, brown tomentum; calyx 1 cm. long; capsule 2-2.5 cm. long, deeply 5-lobed. One of the largest trees of the Central American lowlands, often abundant.

Luehea speciosa Willd. GUÁCIMO.—Without locality, *Bailey* 317, 97. A large or medium-sized tree; leaves whitish tomentose beneath, coarsely serrate; flowers large and showy, the calyx 2.5-3 cm. long, the petals white; capsule hard and woody, 4 cm. long, subterete.

Muntingia Calabura L. PASITO.—Orchid Island, *Wilson* 152. A shrub or small tree; leaves lance-oblong, oblique at the base, 3-nerved; flowers axillary, white; fruit a globose, green or red berry, full of minute seeds. The extremely sweet fruit is edible.

Sloanea microcephala Standley in Field Mus. Bot. 4:152 (1929).—One new collection may be reported: Drayton Trail, *Shattuck* 605. The type was collected along the shore near Termite House, *Kenoyer* 468. A tree 10 meters high; leaves large, long-petiolate, elliptic or oblong, sinuate-crenate, minutely tomentulose or glabrate beneath; fruit dry, ovoid, 2 cm. in diameter, densely covered with stiff, sharp spines 2 cm. long, somewhat resembling a small chestnut bur.

Triumfetta Lappula L. CADILLO, CEPA DE CABALLO.—Standley (Fl. 23). A shrub; leaves long-petioled, dentate and often lobed, stellate-pubescent; flowers small, yellow, without petals; fruit a hard bur 4 mm. wide, densely covered with short spines. A too common, weedy shrub of Central America, growing usually on abandoned or cleared land. The burs adhere in great numbers to clothing.

MALVACEAE

Gossypium mexicanum Tod. COTTON; ALGODÓN. — Near steps at beginning of Lutz Trail, *Woodworth & Vestal* 375. A shrubby plant, scarcely native in the Zone, but often occurring in waste places.

Hibiscus bifurcatus CAV. ALGODONCITO.—Kenoyer & Standley (p. 152). Plants tall, coarse, erect, herbaceous or suffrutescent, the stems covered with coarse prickles; leaves 3-5-lobed, stellate-hispid; corolla rose-pink, 8 cm. long. A showy and handsome plant.

Hibiscus Rosa-sinensis L. CHINESE HIBISCUS; PAPO, TAPO.—Standley (Fl. 23). Planted at the laboratory. One of the favorite ornamental shrubs of Central America, imported from the Old World.

Hibiscus sororius L. f.—Kenoyer & Standley (p. 152). A coarse herb about a meter high, usually growing in shallow water; leaves large, deeply cordate, crenate; bracts subtending the calyx broadly dilated at the apex; petals pink, 5-6 cm. long. A handsome and showy plant.

Hibiscus sororius L. f. forma **albiflorus** Standley, forma nov.—A forma typica non nisi petalis albis differt.—East of Laboratory in water on lake shore, December 23, 1931, *R. H. Wetmore & E. C. Abbe* 25 (type in herb. Field Mus.); on floating islands between Drayton Cabin and Zetek Cabin, common, *Wetmore & Abbe* 187; in water between ends of Fairchild and Gross trails, *Wetmore & Abbe* 100. Regarding the color forms of *Hibiscus sororius*, Dr. Wetmore makes the following statement: "These stands of white and pink forms seem specifically alike, as far as I can see, but very different in color. Fading does not usually give one from the other. All stages from buds to falling corollas give the same coloration." Color of petals is not mentioned in the original description of the species, nor do I find mention of it in works treating the species as it grows in South America, but I have assumed that the pink form is the normal one.

Pavonia dasypetala Turcz.—Standley (Fl. 23). A shrub 1-5 meters high; leaves large, broadly cordate, velvety-pubescent; bractlets numerous at the base of the calyx, linear; petals pink, 4-6 cm. long; fruit with a mucilaginous, fleshy outer coat. A showy plant when in flower.

Pavonia paniculata Cav.—Banana clearing near the laboratory, *Wetmore & Abbe* 150. A tall, coarse herb; leaves broadly cordate, shallowly lobed; petals yellow, 1.5 cm. long; fruit dry.

Pavonia rosea Schlecht.—Standley (Fl. 23). Plants low, herbaceous or suffrutescent; leaves oblong or obovate-oblong, glabrate; petals pink, 1 cm. long; carpels of the dry fruit each with 3 long, barbed spines. One of the most common Central American weeds. The capsules cling tenaciously to clothing by the barbed spines, which sometimes inflict painful wounds if the plant is handled carelessly.

Sida acuta Burm. ESCOBILLA. Called "broom" and "broom-weed" by the West Indians.—Miller Trail, *Shattuck* 482; laboratory clearing, *Shattuck* 539. A low herb; leaves bright green, distichous; petals deep yellow or white. One of the commonest of tropical American weeds.

Sida rhombifolia L. ESCOBILLA.—Standley (Fl. 23). Herbaceous or often somewhat woody; leaves oblong, pale beneath and densely and minutely tomentose; petals buff. Probably the most abundant weed of Central America, and too often associated with *garrapatas* or ticks.

BOMBACACEAE

Bombacopsis Fendleri (Seem.) Pittier. CEDRO ESPINOSO.—Pl. VII A.—Standley (Fl. 23). A giant tree with digitately compound leaves; trunk covered with short, stout prickles; flowers 10 cm. long; capsules coriaceous, 6-7 cm. long. Individuals of this species are said to be the largest trees of Barro Colorado Island. They often have broad buttresses at the base. The leaves fall in January, and the flowers appear a few weeks later; the pods ripen and fall before the new leaves unfold.

Bombacopsis sessilis (Benth.) Pittier. CEIBO.—Standley (Fl. 23). Trunk unarmed, the bark greenish; leaflets 5-7, oblong to obovate, rounded or emarginate at the apex, glabrous; flowers white or pink, 15 cm. long; capsule woody, filled with brownish cotton.

Bombax barrigon (Seem.) Dcne. BARRIGÓN.—A tall deciduous tree; trunk green, smooth, much swollen near the base; leaflets 7-9, oblanceolate to obovate, short-pointed, gla-

brous; flowers large and white; capsules oblong, 18 cm. long, smooth, filled with grayish cotton. The local vernacular name signifies "big-bellied," in allusion to the form of the trunk. The flowers, called "powder puffs" by the Americans about the Zone, and "motas" by the Panamanians, consist mostly of a great mass of stamens, which usually exceed 1000 in number. The silk or cotton surrounding the seeds is similar to the kapok furnished by *Ceiba pentandra*.

Cavanillesia platanifolia HBK. CUIPO, BONGO, QUIPO. — Standley (Fl. 23). A tall tree with small crown, the smooth trunk much swollen below; leaves large, deciduous, 5-7-lobed; flowers small, the red petals 2 cm. long; fruit with a hard, spindle-shaped body, its thin, vertical wings 8 cm. broad. One of the most striking trees of the region, best observed on the Pacific slope, where there are isolated trees. The wood is superlatively light, a cubic foot weighing only 6.25 pounds.

Hampea panamensis Standl. — Standley (Suppl. 124). A small or medium-sized tree; leaves long-petiolate, ovate, entire, acute or acuminate, truncate or rounded at the base, with a minute, pale, stellate tomentum covering the lower surface; flowers white, clustered in the leaf axils, the petals 1 cm. long; capsule obovoid-globose, 1.5 cm. long. Known in the Canal Zone only from Barro Colorado.

Ochroma limonensis Rowlee. Balsa, LANA.—Standley (Fl. 23). A large or medium-sized tree with spreading branches; leaves long-petioled, cordate, 3-angled or shallowly lobed, pale beneath and stellate-tomentose; flowers whitish, 15 cm. long; fruit a narrow 5-celled pod 20 cm. long, filled with brown cotton and numerous small seeds. Called "cotton-tree" by the West Indians. The cotton is employed for stuffing pillows and mattresses. The wood, one of the lightest known, a cubic foot weighing 7.5-12 pounds, is used extensively in the United States for many purposes for which cork formerly served. The tree grows with extreme rapidity.

Quararibea asterolepis Pittier. GUAYABILLO. — Kenoyer & Standley (p. 152). A large tree with buttresses and smooth green bark; leaves oblong to ovate, finely but sparsely stellate-pubescent beneath or almost glabrous, entire; flowers 3 cm. long, the petals white; calyx tubular, not winged; fruit indehiscent. The plants of this genus have the odor of slippery elm.

Quararibea pterocalyx Hemsl. — Standley (Suppl. 124). Flowers 12 cm. long, the narrow calyx with 10 narrow vertical wings.

STERCULIACEAE

Byttneria aculeata Jacq. ESPINO HUECO, ZARZA, RABO DE IGUANA.—Standley (Fl. 24). A shrub, the prickly stems hollow, usually subscandent or recurved; leaves lanceolate to ovate, entire, glabrous or nearly so, often blotched with silver; flowers small and green; fruit a small capsule covered with long spines. Often a troublesome weed in cultivated ground in Central America, especially in banana plantations. Thickets composed of it are impenetrable, except with the aid of a machete.

Melochia lupulina Swartz.—In plantation, *Wilson* 19; without locality, *Shattuck* 656. A slender herb 1 meter high with small toothed leaves; corolla pure white; calyx thin and much enlarged in fruit, pale; fruit a pyramidal capsule.

Sterculia apetala (Jacq.) Karst. PANAMÁ. — Standley (Fl. 24). A large tree; leaves deciduous, long-stalked, large, 3-5-lobed, stellate-tomentose beneath; flowers without petals, the large calyx 5-lobed, dark reddish; fruit of 5 carpels, the large brown seeds resembling chestnuts. It is believed that the name of the Republic of Panama is derived from the Indian term for this tree. The seeds are edible. The interior of the pods is covered with stiff brown bristles that penetrate the skin readily, causing painful irritation.

Theobroma Cacao L. CACAO.—Standley (Fl. 24). Planted at the laboratory, and also to be found in the forest, perhaps there an escape from former cultivation. Cacao is native in some parts of Central America.

Theobroma purpureum Pittier. CACAO CIMARRÓN, CHOCOLATILLO.—Standley (Fl. 24). A slender shrub or small tree; leaves digitately compound, with 5 thin, narrow leaflets 30-50 cm. long; flowers small, borne on the trunk; fruits about 7 cm. long, covered with slender, irritant hairs. The white pulp of the fruit is edible.

DILLENIACEAE

Davilla Kunthii St. Hil. CHUMICO, CHUMIQUILLO. — Cove north of the laboratory, *Woodworth & Vestal* 331. A woody

vine; leaves alternate, coriaceous, oblong to rounded-obovate, rough, pubescent and reticulate-veined beneath; flowers small, in terminal or axillary panicles; larger sepals hirtellous. The delicate, bright yellow petals quickly wither and fall.

Davilla rugosa Poir.—Standley (Fl. 24). Leaves glabrate, not reticulate-veined; larger sepals glabrous.

Dillenia indica L.—Standley (Fl. 24). Planted at the laboratory. A handsome tree with large, dentate, obovate leaves; flowers very large, with thin white petals; fruit globose, large, green, consisting chiefly of the greatly enlarged sepals, edible. Native of tropical Asia.

Doliocarpus brevipedicellatus Garcke. — Standley (Suppl. 124). A woody vine with coriaceous, sinuate-serrate leaves; flowers lateral or axillary, the pedicels shorter than the flowers.

Doliocarpus major Gmel.—Standley (Fl. 24). Flowers in lateral clusters, the pedicels much longer than the flowers; leaves coarsely punctate beneath; ovary pubescent.

Doliocarpus multiflorus Standl. — Shore near Fairchild Point, *Wilson* 154. A small tree, according to the collector, but more probably a vine; flowers in lateral clustered racemes, the pedicels much longer than the flowers.

Doliocarpus olivaceus Sprague & Williams. — Kenoyer & Standley (p. 152). Leaves entire; pedicels shorter than the flowers.

Saurauia Zetekiana Standley in Jour. Arnold Arb. 11:124 (1930).—Type collected near Pearson Trail, *W. N. Bangham* 578. Known only from the island. A shrub or small tree, 5 meters high; leaves short-petiolate, oblong-elliptic or broadly elliptic, short-acuminate, crenate-serrate, glabrous; flowers paniculate, the branches of the panicle stellate-furfuraceous; petals white.

Tetracera oblongata DC.—Kenoyer & Standley (p. 153). A coarse, woody vine; leaves oblong or obovate, usually dentate, very rough, pale; flowers small, paniced; sepals glabrous on the inner surface; fruit of a single, brown, shining carpel.

Tetracera sessiliflora Triana & Planch.—Kenoyer & Standley (p. 153). Leaves glabrate; sepals glabrous; fruit of several carpels.

Tetracera volubilis L. CHUMICO, PASMO DE SOL.—Without locality, *Aviles* 9; dock, *Shattuck* 292. Leaves stellate-

pubescent beneath; sepals sericeous within; fruit of several carpels. The species of this and related genera are well known in Central America as water vines. The pores within the wood are so large that they can be seen readily with the naked eye. When a section of the stem is cut, there issues from it a substantial quantity of clear sap with no distinct flavor, which makes a good substitute for water if one is thirsty. The rough leaves sometimes are employed as a substitute for sandpaper in polishing wood or metal.

OCHNACEAE

Cespedesia macrophylla Seem.—Kenoyer & Standley (p. 153). A tall tree; leaves very large, obovate-spatulate, obtuse, sharply dentate; panicles terminal, large and many-flowered, sometimes a meter long; petals bright yellow. Known in the Zone only from Barro Colorado. With its neat leaves, as much as 60 cm. long, and its huge panicles of golden flowers, this must be one of the most gorgeous of all tropical American trees.

Ouratea nitida (Swartz) Engler. — Zetek Trail, *Shattuck* 243. A glabrous shrub or small tree; leaves alternate, oblong to elliptic, coriaceous, shining, serrate, the veins impressed; flowers in terminal panicles, the petals bright yellow; fruit of a few, juicy, black drupes inserted upon an enlarged red disk. In the Canal Zone this species has been known heretofore only from Ancón Hill, on the Pacific slope.

Ouratea Wrightii (Van Tiegh.) Riley.—Standley (Fl. 24). Frequent in forest. Usually a shrub; veins of the leaves not impressed.

MARCGRAVIACEAE

Marcgravia nepenthoides Seem. BEJUCO DE PIPA.—Pl. VIII B.—Without locality, *Aviles* 67; near boat landing, *Wetmore & Abbe* 95; near laboratory clearing, *Woodworth & Vestal* 635. A huge woody vine, epiphytic; leaves alternate, entire, thick and fleshy, glabrous, oblong, acuminate; inflorescence umbel-like, pendent, the flowers long-pediceled, with greatly modified nectar-bearing bracts, these helmet-shaped and pendent like dippers, reddish; fruit small, globose, indehiscent. The genus has not been reported previously from the Canal Zone. The plant is one of the most curious ones that grows in all Central America. It is well illustrated and described by

Thomas Belt in A NATURALIST IN NICARAGUA. The nectaries are said to be much sought by hummingbirds. In Honduras the vine, or its flowers, is known by the name "cachimba," the usual Central America term for tobacco pipe. The foliage of the vine is so high upon the trees that it seldom may be seen from the ground, but the fallen nectaries may be found in large numbers beneath the trees.

Souroubea guianensis Aubl.—Without locality, *Bailey* 544; Wheeler Trail, *Starry* 96; near Drayton House, *Woodworth & Vestal* 552; Peña Blanca Point, *Shattuck* 804. An epiphytic, pendent or scandent shrub, glabrous throughout; leaves fleshy, oblong to obovate; flowers racemose, subtended by small, spurred bracts; fruit small, globose, fleshy. The stems usually are provided with numerous coarse cordlike aërial roots.

THEACEAE

Ternstroemia Seemannii Triana & Planch. MANGLILLO. — West shore, *Wilson* 132; shore near Zetek House, *Woodworth & Vestal* 686. A glabrous shrub or small tree; leaves alternate, somewhat fleshy, entire, oblanceolate, acute; flowers long-pedicellate, whitish, with leathery sepals; petals white; fruit globose-ovoid, indehiscent.

HYPERICACEAE

Vismia dealbata HBK. PINTA-MOZO. — DeLesseps Island, *Wilson* 92. A shrub or small tree; leaves opposite, entire, usually ovate, the tomentum of the lower surface whitish, at least in age, the blades truncate or obtuse at the base; flowers yellowish or whitish, in terminal cymes; sepals at maturity 7 mm. long. All the local species of this genus (and all the Central American ones) are now known from the island.

Vismia ferruginea HBK. SANGRE DE PERRO.—Standley (Fl. 24). Leaves truncate or obtuse at the base, covered beneath with a loose, rusty tomentum; sepals 9-10 mm. long.

Vismia guianensis (Aubl.) Pers. SANGRILLO.—Without locality, *Bailey* 252; shore near Barbour Point, *Woodworth & Vestal* 714; shore north of Zetek House, *Woodworth & Vestal* 697. Leaves elliptic-ovate, 5-7 cm. wide, obtuse or truncate at the base, with a closely appressed, pale or brownish tomen-

tum beneath; sepals spreading in fruit, 5-6 mm. long; petals yellow, striped with orange. The vernacular name alludes to the fact that the sap turns red upon exposure to the air.

Vismia latifolia Choisy. — Kenoyer & Standley (p. 153). Leaves shallowly cordate at the base, brown-tomentose beneath.

Vismia viridiflora Duchass. — Shore near the laboratory, *Wilson* 7; Miller Trail, *Shattuck* 61; shore of cove in front of Fuertes House, *Wetmore & Abbe* 214; shore north of laboratory, *Woodworth & Vestal* 343, 350. Leaves ovate-oblong or oblong-lanceolate, 2-5 cm. wide, glabrous beneath or nearly so; sepals spreading in fruit, 5-6 mm. long.

GUTTIFERAE

Calophyllum longifolium Willd. MARÍA. — Standley (Fl. 24). A tall forest tree, glabrous throughout; sap yellowish; leaves very handsome, oblong, entire, often 30 cm. long or more, with exceedingly numerous veins; flowers in axillary racemes, whitish; fruit fleshy, 1-seeded. This species has been reported erroneously from the island as *C. calaba* Jacq.

Clusia odorata Seem. COPEY.—Standley (Suppl. 125). A glabrous tree, often epiphytic; leaves opposite, entire, chiefly obovate, thick and fleshy, leathery when dry; flowers with thick fleshy pink petals; fruit a leathery capsule 2.5 cm. wide. Here is to be referred the material reported from the island under the name of *Clusia minor* L.

Clusia rosea L. COPEY.—Standley (Fl. 24). An epiphytic tree; leaves very thick, nearly as broad as long; sap milky, very sticky; flowers solitary or 2 together; capsule 5-8 cm. in diameter.

Rheedia edulis (Seem.) Triana & Planch.—Without locality, *Bailey* 524, 70; Armour Trail, *Starry* 53. A tall, glabrous tree; leaves short-petioled, oblong or lance-oblong, acuminate, coriaceous; flowers small, cream-colored, clustered in the leaf axils or on old wood; fruit olive-like, 2.5 cm. long, smooth, yellow, edible. Called "sastra" in some parts of Panama. Although the fruit is edible, it is little esteemed.

Rheedia madruno (HBK.) Planch. & Triana. MADROÑO, FRUTA DE MONO, MACHARI.—Standley (Fl. 24). A large tree; leaves oblong to elliptic, acuminate; fruit tuberculate.

Symphonia globulifera L. f. CERILLO.—Standley (Fl. 24). A tall, glabrous tree, the bark exuding yellow resin; leaves short-petioled, oblong, 7-11 cm. long, acuminate; flowers globose, red; fruit smooth, indehiscent, reported as edible.

Tovomitopsis nicaraguensis (Oerst.) Triana & Planch. — Standley (Fl. 24). A glabrous shrub or small tree, growing in forest; leaves large, oblong to elliptic, acuminate; flowers small, whitish, paniced; fruit dehiscent at maturity.

BIXACEAE

Bixa Orellana L. ANATTO; ACHOTE.—Kenoyer & Standley (p. 153). A shrub or small tree; leaves alternate, long-petiolate, broadly ovate, entire, minutely lepidote beneath; flowers white or pink, in terminal panicles; fruit a large, globose or ovoid capsule, usually covered with long, pliable prickles. Probably introduced here. From the red pulp surrounding the seeds is obtained the anatto dye of commerce, employed commonly in Europe and the United States for coloring butter, cheese, varnish, and other articles. In Central America it is used generally for coloring rice and other common dishes. The dye long has been used by tropical Indians for painting their bodies.

COCHLOSPERMACEAE

Cochlospermum vitifolium (Willd.) Spreng. POROPORO. — Kenoyer & Standley (p. 153). A large shrub or small tree; leaves deciduous, long-petiolate, cordate at the base, deeply 5-lobate, alternate, almost glabrous; flowers in terminal clusters, bright yellow, 10 cm. broad, resembling roses; fruit a 5-valved ovoid capsule 7-8 cm. long, containing numerous kidney-shaped seeds that are covered with long, white, cottony hairs. The wood is soft and spongy.

VIOLACEAE

Hybanthus anomalus (HBK.) Standl.—Standley (Fl. 24). A shrub 1-3 meters high; leaves alternate, dentate; flowers 3-4 cm. long, white and rather showy; fruit a 3-valved capsule.

Rinorea squamata Blake. MOLENILLO.—Standley (Fl. 24). A shrub or small tree; leaves opposite, crenate, with a few, straight, appressed hairs beneath along the costa; flowers small, greenish, in axillary racemes; fruit a 3-valved capsule.

Rinorea sylvatica (Seem.) Kuntze. — Standley (Fl. 24). Lower surface of the leaves puberulent and short-pilose with spreading hairs, especially along the costa.

FLACOURTIACEAE

Banara guianensis Aubl.—Kenoyer & Standley (p. 153). A shrub or small tree; leaves alternate, short-petiolate, oblong to ovate, acuminate, serrate, densely grayish-pubescent beneath; flowers small, white, in terminal panicles.

Casearia arborea (L. Rich.) Urban. — Without locality, *Bailey* 624. A shrub or small tree, nearly glabrous; leaves narrowly oblong, long-acuminate, finely and inconspicuously serrate; flowers small, white, in short-stalked cymes in the leaf axils; fruit red, sharply 3-angled. The species is an addition to the known flora of the Canal Zone.

Casearia arguta HBK. RASPA-LENGUA.—Standley (Fl. 25). A shrub or small tree; leaves lance-oblong, long-acuminate, sharply and coarsely serrate, pubescent beneath on the veins; flowers on short pedicels, clustered in the leaf axils; fruit globose.

Casearia guianensis (Aubl.) Urban. PALO DE LA CRUZ. — Standley (Fl. 25). Leaves elliptic or obovate, crenate, thin, pellucid-punctate; flowers clustered in the leaf axils.

Casearia javitensis HBK.—Standley (Suppl. 125). Leaves oblong-lanceolate, remotely crenate, coriaceous, opaque; flowers clustered in the leaf axils.

Casearia nitida (L.) Jacq. RASPA-LENGUA.—Standley (Fl. 25). Leaves crenate, pellucid-punctate; flowers in axillary peduncled corymbs.

Casearia sylvestris Swartz.—Standley (Fl. 25). A slender shrub or small tree; leaves oblong or lance-oblong, entire, very unequal at the base; flowers white, in dense axillary clusters.

Hasseltia floribunda HBK. RASPA-LENGUA.—Standley (Fl. 25). A small or medium-sized tree; leaves oblong to elliptic, coarsely serrate, glabrate, 3-nerved at the base; flowers small, white, in terminal panicles.

Laetia Thamnia L.—Without locality, *Bailey* 504; Zetek Trail, *Starry* 40. A small or medium-sized tree; leaves elliptic or elliptic-lanceolate, obscurely crenulate, glabrous, pellucid-dotted; flowers white, in axillary corymbs; fruit a globose

berry 2-4 cm. in diameter. For some reason not now apparent, this genus and species were omitted from the FLORA OF THE PANAMA CANAL ZONE. The following earlier collections from the region have been examined: Alhajuela, *Pittier* 3514; near Fort San Lorenzo, *Maxon & Valentine* 6969. Pittier reports the vernacular name as "conejo."

Oncoba laurina (Presl) Warb. GUAVO CIMARRÓN, CARBONERO.—Standley (Fl. 25). A shrub or small tree; leaves oblong-ovate, 12-30 cm. long, entire; flowers small, white, with petals, racemose-paniculate; fruit dry, covered with long spinelike bristles.

Tetrathylacium Johanseni Standl. — Without locality, *Carpenter*. A small tree; leaves short-petioled, oblong, cuspidate-acuminate, almost entire, glabrous; flowers small, arranged in long catkin-like spikes; fruit a subglobose berry containing numerous seeds.

Xylosma Hemsleyana Standl. — Kenoyer & Standley (p. 153). A shrub or small tree, armed with spines, those of the trunk usually branched; leaves short-petiolate, crenate, obtuse, obovate; flowers clustered in the leaf axils, without petals; fruit a small berry.

Xylosma intermedia (Triana & Planch.) Griseb.—Without locality, *Bailey* 484. A small tree; leaves acuminate.

Zuelania Guidonia (Swartz) Britt. & Millsp. (*Z. Roussoviae* Pittier).—Kenoyer & Standley (p. 153). A small tree; leaves oblong to oval, densely pubescent beneath, inconspicuously serrate; flowers whitish, in dense lateral clusters; fruit a fleshy capsule 3.5 cm. in diameter. Called "caraño" in Darién.

TURNERACEAE

Turnera panamensis Urban.—Standley (Fl. 25). Frequent in the forest. A slender shrub; leaves alternate, with stipules, lance-oblong, almost glabrous; flowers axillary, bright yellow and showy, 2.5 cm. long; fruit capsular.

PASSIFLORACEAE

Passiflora ambigua Hemsl. — Standley (Suppl. 125). A large, woody vine, with tendrils; leaves oblong or ovate-oblong, acuminate, entire; flowers large, the corolla whitish outside, pale purplish within, the stamens banded with violet and white. Not listed in the FLORA OF THE CANAL ZONE.

Passiflora auriculata HBK. — Standley (Fl. 25). Leaves ovate-lanceolate, angulately 3-lobed or subentire, the petiole with glands near the base; bracts of the flower inconspicuous, deciduous; petals present.

Passiflora biflora Lam. — Kenoyer & Standley (p. 154). Leaves shallowly bilobate, often much broader than long, glabrous or nearly so, with conspicuous glands near the base; flowers small, greenish white, the bracts deciduous.

Passiflora coriacea Juss.—Small island near Orchid Island, *Wilson* 95; shore at end of Chapman Trail, *Woodworth & Vestal* 501. Easily recognized by the transversely oblong, peltate leaves; flowers green; fruit blue.

Passiflora hispida DC. — Kenoyer & Standley (p. 154). Plants densely pubescent throughout and glandular-viscid; bracts bipinnatisect, the segments tipped with viscid glands.

Passiflora menispermifolia HBK.—Without locality, *Aviles*; near Fuertes House, *Woodworth & Vestal* 637. Plants densely hispid-hirsute; bracts persistent, lanceolate, attenuate-acuminate; petioles bearing glands.

Passiflora misera HBK.—Zetek Trail, *Shattuck* 263; shore of cove south of French Lock site, *Woodworth & Vestal* 456, 457. Leaves membranous; peduncles solitary, long and slender; bracts deciduous; flowers green.

Passiflora nitida HBK. — Snyder-Molino Trail, *Shattuck* 675. Leaves large, broadly oblong, remotely dentate, the petiole with large glands. The species has not been recorded previously for the Canal Zone.

Passiflora punctata HBK.—Shore east of laboratory, *Wetmore & Abbe* 26. A slender vine; leaves membranous, the petioles without glands; flowers white, on peduncles 3 cm. long or more, the bracts deciduous.

Passiflora Seemanni Griseb. GUATE-GUATE.—Banana clearing near the laboratory, *Wetmore & Abbe* 147; north of banana clearing, *Woodworth & Vestal* 626. A large glabrous vine; leaves entire or rarely 3-lobed, glaucous beneath, the petioles with disk-shaped glands; bracts persistent, large and united; flowers large, variegated with blue and white. Few Central American plants have flowers so strikingly beautiful as this.

Passiflora vitifolia HBK. GUATE-GUATE. — Standley (Fl. 25). A large, woody vine, usually growing in deep forest, only the upper branches leafy; leaves lobed, reddish-tomentellous; flowers borne chiefly on leafless branches, very large, deep red. The starlike flowers are gorgeously colored, and glow like coals of fire in the dark forest where they usually are found.

CARICACEAE

Carica Papaya L. PAPAYA.—Standley (Fl. 25). Planted at the laboratory, and also wild or naturalized in other places. One of the important fruits of tropical America. Probably not native in this region.

BEGONIACEAE

Begonia cilibracteola C. DC. — Kenoyer & Standley (p. 154). Plants erect, perennial, fleshy; leaves alternate, deeply cordate at the base, villous beneath.

Begonia filipes Benth. ALA DE ÁNGEL, HIERBA DE AGUA. — Standley (Fl. 25). A low annual, nearly glabrous; leaves short-petioled, lance-oblong, serrate; flowers small, whitish; capsules broadly winged, the wings very unequal.

Begonia serratifolia C. DC.—Pearson Trail, *Shattuck* 573. An erect perennial; leaves oblique at the base, not cordate, glabrous beneath.

CACTACEAE

Epiphyllum Phyllanthus (L.) Haw.—Standley (Fl. 25). A glabrous epiphyte with broad, thin, ribbon-like stems; spines none; flowers white, 25-30 cm. long, with a long slender tube; fruit a juicy, red or purple berry 7-9 cm. long. The fruits, full of small black seeds, are edible.

Epiphyllum Pittieri (Weber) Britt. & Rose. — Drayton Trail, *Shattuck* 603. Flowers only 10-13 cm. long, white. The species was described from Costa Rica, and has not been reported before from Panama.

Rhipsalis Cassutha Gaertn. MISTLETOE CACTUS. — Kenoyer & Standley (p. 154). A common epiphyte on tall trees, the plants consisting of a dense, pendent mass of cordlike, fleshy, green stems; spines none; flowers whitish, only 2 mm. long; fruit a globose, translucent, white berry 5 mm. in diameter, suggestive of mistletoe berries.

LYTHRACEAE

Adenaria floribunda HBK. FRUTA DE PAVO. — Standley (Fl. 25). A shrub or small tree; leaves opposite, oblong-lanceolate, almost sessile, entire, dotted with black glands on both surfaces; flowers small, whitish, in dense axillary clusters; fruit capsular. Growing usually in thickets or open places.

Cuphea carthagenensis (Jacq.) Macbride (*C. Balsamona* Cham. & Schlecht.).—Near the laboratory, *Bailey* 500. A low, much-branched annual, viscid-pilose; leaves opposite, chiefly elliptic; flowers small, mostly in the axils of leaves, the petals purple; calyx broad, obscurely spurred at the base. An abundant weed of Central América.

Cuphea Wrightii Gray. — Kenoyer & Standley (p. 154). Plants taller and more slender, the leaves narrower; flowers in elongate, bracted racemes; calyx tubular, conspicuously spurred at the base; petals purple. Growing here as a weed in cultivated or waste ground.

Lafoensia punicifolia DC. AMARILLO. — Gigante Bay, *Shattuck* 437; shore of cove south of French Lock site, *Woodworth & Vestal* 475. A glabrous tree; leaves oblong-lanceolate, entire, with a conspicuous pore at the apex on the under surface; flowers racemose or paniced, 12-16-parted, the calyx 3 cm. long; petals yellowish; stamens exserted, red; capsule ovoid, 3-4 cm. long, the large seeds broadly winged. The wood is yellow and fine-grained.

LECYTHIDACEAE

Grias Fendleri Seem.—Standley (Fl. 25). A glabrous tree; leaves alternate, sessile, 40-60 cm. long, entire; flowers white, 2.5-4 cm. broad, the racemes produced along the trunk.

Gustavia superba (HBK.) Berg. MEMBRILLO. — Standley (Fl. 25). Frequent in the forest. A tree 15 meters high or less, with few stout branches; leaves short-petioled, narrow, 50-100 cm. long, serrate, clustered at the ends of the branches; flowers 10-12 cm. broad, in terminal racemes or clustered on the old naked branches, the petals white or purple-tinged, the numerous stamens yellow and purplish; fruit large and fleshy, edible. The tree forms a conspicuous part of the understory in the

forest of the canal region. It is conspicuous because of its characteristic habit and enormous leaves.

RHIZOPHORACEAE

Cassipourea podantha Standl. HUESITO, LIMONCILLO. — Standley (Suppl. 125). A shrub or small tree; leaves opposite, elliptic, entire or nearly so, glabrous; flowers clustered in the leaf axils, small, with hairy white petals. In the first list of Barro Colorado plants (Standley, Fl. 25) *Cassipourea elliptica* Poir. was reported from the island. That species also may occur there, but all the collections now available for examination belong to *C. podantha*.

COMBRETACEAE

Combretum Cacoucia Exell (*C. coccineum* Engl. & Diels). — Standley (Suppl. 125). A large, woody vine; leaves opposite, short-petiolate, oblong, acuminate, almost glabrous; flowers 2 cm. long, in dense leafy-bracted racemes, deep bright red; fruit dry, sharply angled. The plant is highly showy when bearing its spirelike racemes of fiery red flowers, but these last for only a few days.

Combretum farinosum HBK. — Shore east of laboratory, *Wetmore & Abbe* 135; shore near Drayton House, *Woodworth & Vestal* 551. A woody vine; leaves and all other parts bearing numerous pale scales; flowers large and showy, in very dense, one-sided spikes; fruit broadly winged, often deep red. A handsome plant, the greenish yellow flowers with contrasting long, red stamens. The flowers contain an abundance of nectar that is much sought by insects and hummingbirds.

Combretum punctulatum Pittier. — Without locality, *Bailey* 627; west shore, *Wilson* 124. A large vine, the young branches armed with stout straight spines as much as 3.5 cm. long; leaves glabrate; spikes slender and distantly flowered, not one-sided, the flowers small and inconspicuous. Dr. Bailey has labeled this as the "black-thorn vine," an appropriate name.

Terminalia Hayesii Pittier. AMARILLO REAL. — Standley (Fl. 25). A tall forest tree, the young parts rusty-pubescent; leaves alternate, obovate or oblanceolate, entire, almost gla-

brous; flowers greenish, in slender spikes; fruit bearing several broad, thin, longitudinal wings.

MYRTACEAE

Calycolpus Warscewiczianus Berg. GUAYABILLO.—Standley (Fl. 26). A slender shrub, growing in forest; leaves opposite, short-petioled, ovate to oblong-lanceolate, long-acuminate, entire; pedicels solitary or clustered in the leaf axils and at the tips of the branches; petals pink or whitish; ovary 4-5-celled.

Eugenia Banghamii Standley in Jour. Arnold Arb. 11:125 (1930).—Type collected on the lake shore south of the laboratory, *W. N. Bangham* 448. A shrub 3 meters high; leaves short-petiolate, oblong-elliptic, 8-10 cm. long, short-acuminate, softly pubescent on both surfaces, gland-dotted beneath (as in other species); flowers fasciculate in the leaf axils. Known only from Barro Colorado Island.

Eugenia melanosticta Standley in Jour. Arnold Arb. 11:126 (1930). Type collected on the lake shore south of the laboratory, *Bangham* 445; known only from the island. A shrub or tree 4-6 meters high; leaves coriaceous, oblong, 8-12 cm. long, short-acuminate, glabrous; inflorescences axillary, subracemose, few-flowered; berries 10-12 mm. long.

Eugenia sericiflora Benth. CORALILLO.—Kenoyer & Standley (p. 154). A shrub; leaves lanceolate, long-acuminate; flowers in open corymbs about as long as the leaves.

Eugenia sp.—Wheeler Trail, *Starry* 109. The sterile material appears to represent a species of *Eugenia* different from all those recorded for the Canal Zone.

Myrcia gatunensis Standley in Field Mus. Bot. 4:154 (1929).—Type collected near the lake on Barbour Trail, *L. A. Kenoyer* 468. A shrub about 3 meters high; leaves lance-oblong, sparsely strigillose beneath, gland-dotted; flowers white, the lateral and terminal panicles many-flowered. Known only from Barro Colorado.

Psidium Guajava L. GUAVA; GUAYABA.—Standley (Fl. 26). Frequent in open places. A shrub or small tree, often planted for its edible fruit, which is utilized mostly for making guava paste or jelly, a popular dessert. One of the common small trees of Central America.

MELASTOMACEAE

Clidemia dentata Don.—Shore near Termite House, *Wilson* 59; shore of cove, west of Drayton House, *Woodworth & Vestal* 607. A shrub, the branches densely short-setose; leaves opposite, mostly ovate, obtuse at the base; panicles little longer than the petioles, the small, white flowers 5-6-parted; fruit a small, blue berry.

Clidemia neglecta Don.—Kenoyer & Standley (p. 155). A brown-hairy shrub, the branches glandular-pilose; panicles usually more than half as long as the leaves, the flowers 5-6-parted.

Clidemia petiolata (Rich.) DC.—Standley (Fl. 26). Leaves minutely scurfy-puberulent or glabrate; flowers 4-parted, in small lax cymes.

Conostegia bracteata Triana.—Standley (Fl. 26). A shrub, the branchlets setose with simple hairs; leaves 5-nerved; calyx, as in other species, closed in bud, the top circumscissile, separating as a cap; fruit a berry.

Conostegia micromeris, sp. nov.—Pl. XV.—Arbor parva ut videtur dense ramosa, ramulis gracilibus subteretibus minute subsparsis stellato-furfuraceis, internodiis abbreviatis; folia mediocria, membranacea, opposita, brevissime petiolata petiolo 2-5 mm. longo stellato-furfuraceo; lamina oblongo-elliptica vel lanceolato-oblonga, 6-13 cm. longa et 2.5-5 cm. lata, longissime anguste acuminata, interdum abrupte subcaudato-acuminata, basi acuta, quintuplinervia, obscure undulato-dentata, supra laete viridis, statu juvenili sparsissime minuteque furfuracea mox glabra, subtus paullo pallidior fere glabra; paniculae terminales, sessiles vel usque ad 2 cm. longe pedunculatae, pyramidales, laxae pauciflorae, circa 3 cm. longae et aequilatae, ramis infimis divaricatis minute stellato-furfuraceis, bracteis infimis 3 mm. longis lanceolatis longe caudatis, superioribus brevioribus, floribus plerumque ternatis sessilibus vel breviter pedicellatis; calyx in alabastro clausus, 3-3.5 mm. tantum longus, crasse ellipsoideus, apiculatus, minute furfuraceus; petala glabra, late spathulato-obovata, apice rotundata, 3.5 mm. longa; stamina petalis aequilonga, antheris oblongo-ovatis 1 mm. longis; stylus crassus petalis longior.

P a n a m a : Barro Colorado Island, shore of cove, west

of Drayton House, Feb. 16, 1932, *R. H. Woodworth & P. A. Vestal* 602 (Herb. Field Mus. No. 651885, type).

Noteworthy for the reduced inflorescences and unusually small flowers.

Conostegia speciosa Naud. DOS CARAS, RASPA-LENGUA, FRUTA DE PAVA.—Standley (Fl. 26). A shrub, the branches setose with stellate-tipped hairs; leaves 5-plinerved; flowers pink; fruit purple. One of the common shrubs of the Canal Zone.

Conostegia xalapensis (Bonpl.) Don. CANILLITO.—Without locality, *Aviles* 99; shore of point east of Peña Blanca, *Woodworth & Vestal* 678; Gross Point, *Shattuck* 857. A large shrub or small tree, the branchlets densely and finely stellate-scurfy; leaves 5-nerved, covered beneath with a dense fine, white or brownish, stellate tomentum. Probably the most common of the woody melastomes of Central America, handsome because of the great abundance of flowers and fruit and its bicolored leaves. The small, globose, dark blue or purple fruit is sweet and of excellent flavor, reminding one somewhat of blueberries. It often is gathered in large quantities in certain parts of Central America.

Heterotrichum octonum (Bonpl.) DC.—Standley (Fl. 26). A slender shrub, the branches densely long-setose; leaves broadly ovate, 7-9-nerved, cordate at the base, pale and stellate-pubescent beneath; flowers rather large, white, in small, chiefly terminal panicles; fruit baccate, purplish black.

Leandra dichotoma (Don) Cogn.—Kenoyer & Standley (p. 155). A copiously pubescent shrub; leaves long-petioled, ovate or elliptic, rounded or obtuse at the base, crenate-serrate; flowers small, in terminal panicles; fruit baccate.

Miconia argentea (Swartz) DC. DOS CARAS, CANILLO, PAPELILLO.—Standley (Fl. 26). A small tree; leaves large, green on the upper surface, covered beneath with a fine, white tomentum; flowers small, white, in terminal panicles. One of the most common and conspicuous small trees of the Canal Zone, especially on the lake shores; especially conspicuous when the leaves are stirred by the wind, exposing the under surfaces so that the trees appear to be covered with white flowers, even when no flowers are present.

Miconia Beurlingii Triana.—Standley (Fl. 26). A shrub; leaves petiolate, 3-5-nerved, acute or obtuse at the base, 5-8 cm. wide, glabrate beneath.

Miconia borealis Gleason.—A slender shrub or small tree; leaves 3-5-nerved, rounded at the base, 2.5-4 cm. wide, glabrate; flowers very small, white. This has been reported (Standley, Suppl. 126) from the island as *M. minutiflora* (Humb. & Bonpl.) DC.

Miconia impetiolearis (Swartz) Don. DOS CARAS, OREJA DE MULA.—Standley (Fl. 26). A shrub or small tree; leaves large and broad, sessile and more or less clasping at the base, brownish and finely stellate-pubescent beneath.

Miconia lacera (Humb. & Bonpl.) Naud.—Standley (Fl. 26). Common. A shrub; leaves petiolate, rounded at the base, setose beneath; branches long-setose; flowers conspicuously secund.

Miconia lonchophylla Naud.—Standley (Fl. 26). A shrub; leaves 3-5-nerved, acute at the base, petiolate, glabrate beneath.

Miconia nervosa (Smith) Triana.—Standley (Fl. 26). A shrub; leaves petiolate, attenuate at the base, hirsute beneath.

Miconia Shattuckii, sp. nov.—Pl. XVI.—Frutex, ramulis crassiusculis densissime villosa-tomentosis, pilis patentibus breviter hispidulis vel basin versus stellato-ramosis brunne-scentibus; folia magna, membranacea, breviter petiolata petiolo crasso 1-2.5 cm. longo ut ramuli villosa; lamina late elliptica vel oblongo-elliptica, 23-34 cm. longa et 13-18.5 cm. lata, breviter acuminata, basi late rotundata vel basin versus paullo angustata et breviter anguste cordata, auriculis late rotundatis circa 1 cm. longis, subintegra vel praesertim apicem versus undulato-repando-dentata, basi 7-nervia, supra laete viridis glabra vel pilis paucis longis remotis conspersa, subtus brun-nescens ad nervos brunneo-villosa vel villosula, nervis secundariis transversis numerosis approximatis parallelis angulo recto divergentibus; inflorescentia terminalis, 3.5-4.5 cm. longe pedunculata, erecta, cymoso-paniculata vel corymbiformis, circa 8 cm. longa et fere aequilata, ramis primariis brevibus crassis divaricatis dense stellato-villosulis, floribus laxe dispositis plerisque 1-2 mm. longe pedicellatis, bracteis minutis; ovarium campanulatum, fere 2 mm. longum, sparse puberulum, calycis limbo circa 1 mm. longo remote repando-denticulato,

dentibus 5 ovatis brevissimis acutiusculis viridibus; petala ut videtur alba, 4 mm. longa, obovato-spathulata, glabra, apice subtruncata basin versus sensim angustata; antherae lineari-attenuatae, 2 mm. longae, apice biporosae; bacca depressoglobosa 4.5 mm. diam. leviter 5-sulcata et 5-costata.

P a n a m a : Barro Colorado Island, Snyder-Molino Trail, Canal Zone, October 24, 1931, *Otis Shattuck* 335 (Herb. Field Mus. Nos. 647660-647661, type).

The species is exceptionally distinct because of the form of its leaves, which are remarkably large and shallowly cordate at the base, with short, more or less overlapping lobes.

Mouriria parvifolia Benth. ARRACHECHE. — Standley (Fl. 26). A glabrous shrub; leaves sessile, entire, ovate, small, pinnated-nerved; flowers small, axillary; fruit baccate. In its pinnate-nerved leaves this plant is altogether unlike the other local melastomes, all of which have leaves with conspicuous, longitudinal nerves.

Ossaea disparilis, sp. nov.—Pl. XVII.—Frutex 1.5-2 m. altus, fere omnino glaber, ramulis gracilibus subteretibus rigidis; folia plus minusve inaequalia, mediocria, membranacea, graciliter petiolata petiolo 1-1.5 cm. longo, in sicco laete viridia vel fusca; lamina elliptica vel oblongo-elliptica, 8.5-15 cm. longa et 3.5-6.5 cm. lata, abrupte longe caudato-acuminata, basi acuta vel subrotundata et abrupte contracto-decurrens, trinervia, glabra, vulgo remote undulato-dentata vel interdum subintegra, dentibus cilio brevi terminatis, supra lucida, subtus paullo pallidior et brunnescens, nervis secundariis subcrebris parallelis angulo recto divergentibus; inflorescentia terminalis vel pseudo-lateralis, thyrsiformi-paniculata, breviter pedunculata, foliis multo brevior, usque ad 5.5 cm. longa, ramis brevibus rectis adscendentibus sparse minute furfuraceo-puberulis vel fere omnino glabris plerisque trifloris, floribus sessilibus; ovarium 3.5-4 mm. longum, oblongum, sparse furfuraceo-puberulum vel glabratum; calyx subtruncatus, lobis exterioribus 4 anguste triangulari-oblongis 1.5 mm. longis acutis erectis; petala 4, sepalis vix longiora, pleraque rotundato-obovata et apice subemarginata, interdum apice rotundata vel acutiuscula; stamina 8, filamentis glabris calyce longioribus, antheris subaequalibus lineari-attenuatis 3-3.5 mm. longis apice uniporosis saepe saltem post anthesin recurvis; bacca

globoso-ellipsoidea, 4 mm. longa, glabra, crasse 8-costata, calyce persistente plus minusve accrescente coronata.

P a n a m a : Barro Colorado Island, June 16, 1931, *L. H. & Ethel Zoe Bailey* 201 (Herb. Field Mus. No. 643074, type); July 6, *Bailey* 506; Barro Colorado Island, *Aviles* 21; Buena Vista Camp on Chiriquí Trail, Prov. Bocas del Toro, alt. 375 m., *Cooper* 593. N i c a r a g u a : Region of Braggman's Bluff, in poorly drained, very wet soil under partial shade, *Englesing* 81. G u a t e m a l a : Cubilquitz, Alta Verapaz, 350 m., *Tuerckheim* 8519.

The generic position of this shrub is decidedly doubtful. It has been referred, probably by Cogniaux (the Guatemalan collection) to *Ossaea ciliata* (Griseb.) Cogn., but it does not agree with Grisebach's description of that species or with the somewhat different one of Cogniaux. At any rate, the Trinidad plant, whatever it may be, needs a new name, since the binomial *Ossaea ciliata* is untenable. Because of its obtuse or emarginate petals, *Ossaea disparilis* will run in most keys directly to the genus *Miconia*, but its fruit is quite unlike that of most *Miconias*, and the plant does not resemble at all closely any species of *Miconia* of which I have seen material. It may be remarked that some of the plants usually referred to *Ossaea* have petals quite as obtuse as those of this Central American shrub, consequently the character of acute petals can not be a dependable one.

Ossaea disparilis, var. *adenophora*, var. nov. A forma typica non nisi bacca pilis elongatis gracilibus patentibus glanduliferis sparse induta differt.

H o n d u r a s : Lancetilla Valley, near Tela, Dept. Atlántida, wet forest, December 16, 1927, *Paul C. Standley* 53111 (Herb. Field Mus. No. 582816, type; duplicate in Herb. Arnold Arb.).

A shrub 1.5 m. high; rachis of the inflorescence red; fruit white, translucent, with the flavor of black pepper. The available material is in an advanced fruiting stage, consequently the flower details can not be studied, but the plant seems to differ in no respect from other Central American material of *O. disparilis* except in the long gland-tipped hairs scattered over the fruit.

Ossaea diversifolia (Naud.) Cogn. FRUTA DE PAVA.—Standley (Fl. 26). A slender shrub, the branches densely furfuraceous; leaves abruptly decurrent at the base, scurfy-pubescent beneath; flowers 5-parted, in small axillary panicles, pink; fruit juicy, black or purple.

Ossaea micrantha (Swartz) Macfad.—Standley (Fl. 26). A shrub; branches glabrate; flowers 4-parted, in axillary panicles; branches glabrate.

Schwackaea cupheoides (Benth.) Cogn.—Dock, *Shattuck* 299. A small branched annual with reddish stems; leaves ovate, entire, 3-nerved; flowers small, pink, sessile in the leaf axils; calyx with 8 prominent ribs; fruit a small capsule.

Tibouchina longifolia (Vahl) Benth. — Standley (Fl. 26). Plants herbaceous or suffrutescent, a meter high or less; leaves pubescent, lanceolate, 5-nerved; flowers white, small and inconspicuous; fruit a capsule.

ONAGRACEAE

Jussiaea decurrens (Walt.) DC.—On shore, *Bailey* 384. A slender branched herb about a meter high; leaves alternate, entire; flowers axillary, with inferior ovary and green sepals; petals bright yellow, delicate, soon falling; capsule short, with narrow wings along the 4 angles.

Jussiaea leptocarpa Nutt. — Without locality, *Bailey* 650; floating islands off end of Redwood House, *Wetmore & Abbe* 189; cove at east end of Chapman Trail, *Woodworth & Vestal* 533. Stems pilose with long, spreading hairs; leaves narrowly lanceolate; capsule terete, elongate; flowers 5-parted.

Jussiaea natans HBK. — Kenoyer & Standley (p. 155). Plants aquatic, floating on the surface of water, glabrous; leaf blades nearly or quite as broad as long.

Jussiaea suffruticosa L.—Standley (Fl. 26). Common in wet places. Flowers 4-parted; capsule terete, elongate. One of the most common weedy plants of Central America.

ARALIACEAE

Didymopanax morototoni (Aubl.) Dcne. & Planch. MANGABÉ, GARGORÁN, PAVA.—Standley (Fl. 26). A large forest tree; leaves digitately compound, the 7-10 leaflets oblong or

obovate, entire, acuminate, pale-tomentose beneath; flowers small, in paniced umbels; fruit small, baccate, strongly compressed, glaucous, 2-celled. A common and conspicuous tree of the Canal Zone.

Gilibertia arborea (L.) March. (*Dendropanax arboreum* Dcne. & Planch.). VAQUERO.—Standley (Fl. 26). A large shrub or small tree; leaves long-petioled, glabrous, exceedingly variable, on flowering branches oblong to oval, on sterile branches mostly 3-lobed; flowers small, greenish white, in racemose umbels; fruits black.

Nothopanax Guilfoylei (Cogn. & Marchal) Merrill.—Standley (Fl. 26). Planted at the laboratory; native of the East Indies or Polynesia. A common ornamental shrub with pinnate leaves, the thin leaflets bordered with white. Often planted in the tropics as a hedge plant.

Oreopanax capitatum (Jacq.) Dcne. & Planch. — Without locality, *Aviles* 107; Lutz Trail, *Wetmore & Abbe* 247, 248. A large shrub or woody vine, epiphytic, reported as growing on a tree of *Anacardium excelsum*; leaves ovate or rounded, entire; flowers in stalked paniced heads. The genus has not been recorded previously for the Canal Zone.

UMBELLIFERAE

Eryngium foetidum L. CULANTRO, CULANTRO COYOTE. — Kenoyer & Standley (p. 155). A glabrous, strong-scented, perennial herb; leaves mostly in a basal rosette, oblanceolate or spatulate, coarsely dentate; flowers small, greenish, in dense heads subtended by leaflike bracts. Called "spirit-weed" and "fit-weed" by the West Indians, the latter name being applied because of the plant's use as a remedy for "fits." All parts of the plant, but especially the root, have a characteristic strong, offensive odor, but the leaves are much used in Central America for flavoring soups and stews, to which they give a most agreeable flavor.

Hydrocotyle umbellata L.—In water, *Bailey* 657; on logs close to the shore near Termite House, *Wilson* 57; marsh near Drayton House, *Woodworth & Vestal* 565. A creeping glabrous herb; leaves rounded, peltate, shallowly crenate; flowers small, greenish, in simple umbels.

Spananthe paniculata Jacq. — Without locality, *Aviles* 18. A branched glabrous herb; leaves cordate or deltoid, crenate or serrate; flowers small, greenish, in few-flowered umbels. This plant, common in some parts of Central America, is rare about the Zone.

MYRSINACEAE

Ardisia compressa HBK.—Standley (Fl. 26). A glabrous shrub or tree; leaves alternate, short-petiolate, elliptic, acute, entire; flowers small, white, in paniced umbels; fruit globose, 1-seeded, black, juicy. The flowers are rather pretty and conspicuous. The fruits are edible, but they have little flesh or juice.

Ardisia myriodonta Standley in Jour. Wash. Acad. Sci. 17:13 (1927). Type from Barro Colorado Island, *Standley* 40848. Known only from the island. A low shrub, less than a meter high; leaves large, thin, finely serrate.

Stylogyne laevis (Oerst.) Mez.—Standley (Fl. 26). A glabrous shrub; leaves thick, entire, elliptic to oblong; flowers small, white or pinkish, in terminal panicles, the rachises bright red; fruits juicy, globose, 5 mm. in diameter, black.

Stylogyne ramiflora (Oerst.) Mez. — Standley (Fl. 26). Similar, but the inflorescences lateral or axillary. Both species grow usually in deep forest.

SAPOTACEAE

Chrysophyllum Cainito L. STAR-APPLE; CAINITO. — Standley (Fl. 27). A common forest tree; leaves alternate, entire, densely covered beneath with golden-brown hairs, 7-15 cm. long; flowers small, clustered in the leaf axils; fruit resembling a small apple, green or purple, containing several seeds. The tree is a strikingly handsome one because of its dense foliage. When it is stirred by the wind there is produced a handsome effect of ripples of gold passing across the deep green of the outer surface of the crown. The flesh of the fruit is sweet, but rather insipid, and the sticky latex that it contains is not altogether pleasant.

Chrysophyllum panamense Pittier. — Kenoyer & Standley (p. 155). A large or medium-sized tree; leaves thinly sericeous beneath with whitish hairs; fruit usually with a single

seed, sometimes with more. A common forest tree of the region.

Lucuma glabrifolia Pittier?—Standley (Suppl. 127). A tree 10 meters high with milky sap, collected on the north shore near the end of Pearson Trail. The specimens are sterile, and their determination doubtful.

Another sapotaceous tree is represented by *Starry* 100, collected on Wheeler Trail. It does not appear to be referable to any of the Sapotaceae reported from Panama.

LOGANIACEAE

Spigelia Anthelmia L.—Without locality, *Bailey* 367. A low annual; stems terete; leaves opposite or whorled, lanceolate, acuminate; flowers small, whitish, in one-sided spikes, these terminal or in the forks of the branches; fruit a small didymous muricate circumscissile capsule. Both species have long been used in tropical America as a remedy for tapeworms and other intestinal parasites.

Spigelia Humboldtiana Cham. & Schlecht. — Standley (Fl. 27). Perennial; stems 4-angled; capsule smooth. A common weed of Central America, growing most often in moist shady places. Called "lombricera" in some regions.

Strychnos darienensis Seem.—Standley (Fl. 27). A slender, woody vine; leaves opposite, entire, ovate, 3-5-nerved, coriaceous, 12-16 cm. long; branchlets puberulent with minute, subappressed hairs.

Strychnos panamensis Seem. CANJURA, FRUTA DE MURCIÉLAGO.—Standley (Fl. 27). Branches glabrous or hirtellous; leaves thin, 4-8 cm. long; corolla white, with a long, slender tube; fruits baccate, globose, 4-8 cm. in diameter, with a hard shell, containing numerous large seeds. From an Indian species of this genus are obtained the drugs strychnine and nuxvomica. American species of *Strychnos* probably possess similar properties.

Strychnos toxifera Benth.—Standley (Fl. 27). Plants densely hirsute with long, spreading, brown hairs; corolla hirsute. Frequent in the forest. This plant supplies at least one of the ingredients of the drug curare, one of the deadliest poisons known. This substance has been employed extensively by South American Indians for poisoning their arrows, par-

ticularly those shot from blowguns, and it is reported that a similar use is made of this plant by the Indians of Panama.

GENTIANACEAE

Chelonanthus alatus (Aubl.) Standl.—Miller Trail, *Shattuck* 473; shore near end of Gross Trail, *Woodworth & Vestal* 710. An erect, glabrous herb 2 meters high or less; leaves opposite, ovate or lanceolate; flowers 2 cm. long, greenish, racemose, the racemes arranged in cymes.

Leiphaimos albus Standl.—Kenoyer & Standley (p. 155, *pl.* 13). A small, delicate, white saprophyte, the flowers in cymes. Known in the Canal Zone only from Barro Colorado Island.

Leiphaimos simplex (Griseb.) Standl.—Standley (Fl. 27). Of occasional occurrence in dark, moist forest, among dead leaves. Plants very slender and weak, 6-12 cm. long; flower only one, the pale blue limb of the corolla 6-8 mm. broad.

Schultesia lisianthoides (Griseb.) Benth. & Hook.—Island off Gross Point, *Shattuck* 845. An erect, pale annual; leaves sessile, obovate or oblong, entire; flowers 12 mm. long, the corolla dirty pink.

APOCYNACEAE

Allamanda cathartica L.—Kenoyer & Standley (p. 155). A woody vine; leaves in whorls of 3-4, obovate-oblong; flowers bright yellow, trumpet-shaped, 7-9 cm. long; fruit dry, orbicular, compressed, 4-6 cm. broad, covered with long, stout spines. The flowers are called "buttercups" by the Americans living in the Zone. The plant is showy when in bloom, and often is planted for ornament in such regions as Florida.

Aspidosperma megalocarpon Muell. Arg. — Kenoyer & Standley (p. 27). A tall forest tree; leaves opposite, oblong, entire, 12-20 cm. long, glabrous in age; inflorescence tomentose, cymose-paniculate, the flowers 6 mm. long; fruit a dry capsule, obovate, compressed, somewhat oblique, 12-16 cm. long, contracted below into a stout stalk; seeds compressed, the body surrounded by a broad, thin, transparent wing, the whole 7-9 cm. in diameter. The large, thin seeds are rather handsome. In some regions the term "mariposas," i. e. butterflies, is applied to them. In the Canal Zone this tree has been found only on Barro Colorado.

Catharanthus roseus (L.) Don (*Lochnera rosea* Reichenb.). JAZMÍN, CHAVELITA.—Collected by Bailey. Suffruticose, almost glabrous; leaves opposite, oblong or obovate, obtuse; flowers axillary, solitary or in twos, the white or pink corolla 3 cm. long. Often planted for ornament in Central America, and thoroughly naturalized in many regions; a native of the Old World.

Lacmellea edulis Karst.—Without locality, *Aviles* 88; shore near Orchid Island, *Wilson* 98; shore of cove, south of French Lock site, *Woodworth & Vestal* 470; cove, north of Fuertes House, *Woodworth & Vestal* 639. A small tree; flowers small, white or yellowish, in pedunculate, axillary cymes; fruit ovoid, drupaceous, yellow. The Barro Colorado specimens agree well with Karsten's descriptions, and with plate 152 of his flora of Colombia. He states that the fruits are sweet and edible, and that the local name of the tree is "leche y miel"—"milk and honey"—hence the generic name *Lacmellea*. Karsten's specimens were collected in Colombia along the Río Meta. The genus is new for the North American flora.

Mandevilla subsagittata (Ruiz & Pavón) Woodson (*Echites microcalyx* A. DC.).—Standley (Suppl. 127). A slender climbing shrub; leaves opposite, oblong to elliptic, usually pubescent beneath; flowers in axillary racemes; calyx lobes acuminate; corolla 2.5-3 cm. long, greenish yellow with a reddish throat; fruit of two long, slender pods.

Mesechites trifida (Jacq.) Muell. Arg. (*Echites trifida* Jacq.).—Standley (Suppl. 127). A slender, woody vine; leaves oblong or elliptic, opposite, glabrous; flowers racemose, the corolla 2.5-3 cm. long, the tube green and reddish, the lobes greenish white; fruit of two slender pods.

Odontadenia Hoffmannseggiana (Steud.) Woodson (*O. speciosa* Benth.). NEGRILLO.—Standley (Fl. 27). A large, woody vine; leaves opposite, short-petiolate, oblong to elliptic, glabrous, 15-30 cm. long; flowers yellow, 5 cm. long, in large cymes.

Prestonia exserta (A. DC.) Standl.—Shore south of Barbour Trail, *Woodworth & Vestal* 498. A climbing shrub; leaves opposite, short-petioled, densely puberulent beneath; flowers in cymes, the calyx 6-7 mm. long; corolla greenish yellow, 2 cm. long; fruit of 2 large follicles.

Prestonia ipomoeifolia A. DC.—Kenoyer & Standley (p. 155). A large, woody vine; leaves hirsute beneath; corolla yellow, 2.5 cm. long, its tube hirsute.

Prestonia obovata Standl.—Standley (Fl. 27). Leaves glabrous, obovate, pale beneath; calyx 15 mm. long.

Prestonia portobellensis (Beurl.) Woodson (*P. macrocarpa* Hemsl.).—Standley (Suppl. 127). Leaves glabrous, oblong or elliptic, green beneath; corolla almost 3 cm. long, greenish outside, dull purple within, with yellow throat; pods incurved, terete, glabrous, 25-25 cm. long and 5 mm. thick.

Rhabdadenia biflora (Jacq.) Muell. Arg. (*R. paludosa* [Vahl] Miers).—Without locality, *Bailey* 656. A woody vine with milky latex, glabrous; leaves opposite, fleshy, oval to oblong-linear; flowers 6-7 cm. long, whitish, in few-flowered racemes; fruit of 2 long, slender follicles.

Stemmadenia grandiflora (Jacq.) Woodson (*Tabernaemontana grandiflora* Jacq.). HUEVO DE GATO, LECHUGA, VENE-
NILLO.—Standley (Fl. 27). A glabrous shrub or small tree; flowers showy, bright yellow, 5 cm. long; calyx lobes foliaceous, 1.5 cm. long; follicles large and fleshy.

Tabernaemontana arborea Rose. — Zetek Trail, *Shattuck* 818. A small or medium-sized tree; leaves glabrous, opposite; flowers in cymes, white, the corolla tube 1 cm. long; fruit of fleshy pods.

Thevetia nitida (HBK.) A. DC. COJÓN DE GATO, LAVAPERRO, HUEVO DE TIGRE.—Standley (Fl. 27). A glabrous shrub or small tree; leaves alternate, obovate, thick and somewhat fleshy, lustrous; corolla large, funnelform, bright yellow; fruit large, fleshy, bright red.

ASCLEPIADACEAE

Asclepias curassavica L. MILKWEED; NIÑO MUERTO, PASO-
RÍN.—Standley (Fl. 27). An erect, perennial herb; leaves opposite, oblong or lanceolate; flowers purple-red and orange, in umbels. A common weed of Central America. The only *Asclepias* of the Canal Zone.

Fischeria funebris (Donn. Smith) Blake.—Without locality, *Aviles*; *Bailey* 286; *Shattuck* 816. An herbaceous vine with densely hirsute stems; flowers umbellate, pinkish white. The genus has not been listed previously for the Canal Zone.

Funastrum clausum (Jacq.) Schlechter.—Kenoyer & Standley (p. 155). A nearly glabrous, herbaceous, somewhat fleshy vine; leaves linear to elliptic-oblong, pale beneath; flowers whitish, 10-14 mm. broad, in stalked umbels; pods 5-6.5 cm. long. Often growing in marshes.

Marsdenia crassipes Hemsl.? Fairchild Point, *Shattuck* 341. An herbaceous vine. The specimens have fruits only, and the determination is doubtful. If not referable to this species, they represent another new to the Canal Zone flora.

Vincetoxicum dubium (Pittier) Standl. — Second cove east of Redwood House, on shore, *Wetmore & Abbe* 202. An herbaceous vine; leaves cordate at the base; flowers in axillary umbels, yellowish brown, the corolla papillose within, its lobes attenuate.

Vincetoxicum pinguifolium Standley in Jour. Wash. Acad. 17:13 (1927). Type from Barro Colorado Island, *Standley* 40946; known only from the island. A large climbing herb; leaves rounded-ovate, minutely soft-pubescent, deeply cordate at the base; corolla reddish brown, long-pilose within, 6 mm. long, the lobes ovate, obtuse; pods lanceolate in outline, long-acuminate, sharply angled, glabrous.

CONVOLVULACEAE

Aniseia martinicensis (Jacq.) Choisy.—Standley (Suppl. 127). Growing chiefly in marshes. An herbaceous vine; leaves oblong, obtuse, glabrate or somewhat pubescent, alternate, entire; flowers axillary, long-stalked, white; outer sepals much broader than the inner ones, usually cordate; fruit a small capsule.

Ipomoea Batatas (L.) Lam. SWEET POTATO; CAMOTE. — Kenoyer & Standley (p. 155). Cultivated in the laboratory garden and escaping. Often growing as a weed in Central America.

Ipomoea Morelii Duchass. & Walp. BATATILLA.—In front of Redwood House, on lake shore, *Wetmore & Abbe* 192. A large vine; leaves entire; sepals obtuse, 1 cm. long; corolla 5 cm. long, bright purple.

Ipomoea polyanthes Roem. & Schult. BATATILLA AMARILLA.—Laboratory clearing, *Shattuck* 576; new garden, on lake shore, *Wetmore & Abbe* 185; near laboratory clearing,

Woodworth & Vestal 685. Leaves broadly cordate, entire, often sericeous but more commonly glabrate; flowers in umbels; corolla yellow, 2-2.5 cm. long. Easily recognized by the yellow flowers.

Ipomoea tiliacea (Willd.) Choisy.—Edge of lake, *Starry* 266; dock, *Shattuck* 467; shore, Barbour Point, *Wetmore & Abbe* 159; shore east of Drayton House, *Woodworth & Vestal* 578. Leaves mostly entire; sepals glabrous, acuminate; corolla purple, 4 cm. long.

Ipomoea triloba L. CAMPANILLA.—Without locality, *Bailey* 673; Wheeler Trail, *Starry* 121. Leaves 3-lobed or often entire; sepals acuminate, pubescent or at least ciliate; corolla pink.

Ipomoea Vestalii, sp. nov.—Pl. XVII.—Herba scandens, caulibus gracillimis striatis glabris, internodiis elongatis; folia membranacea, petiolata petiolo gracili 1.5-4 cm. longo supra sparse piloso vel glabrato; lamina anguste hastata, 7-11 cm. longa, basi 3-5 cm. lata, integra vel interdum versus basin grosse dentata vel breviter triangulari-lobata, longe attenuata, basi profunde cordata sinu rotundato, lobis basilaribus paullo excurvis acutis vel acuminatis margine inferiore rotundato-convexis, superiore leviter concavis, supra prasertim ad margines costamque puberula vel minute pilosa, aliter glabra vel glabrata, subtus pallidior, fere omnino glabra; pedunculi axillares, pauciflori, petiolis subaequales, glabri, pedicellis circa 1 cm. longis supra paullo incrassatis glabris, bracteis persistentibus lanceolatis extus minute pilosis usque ad 3 mm. longis; sepala glabra, membranacea, inaequalia, exteriora latissime elliptica, 7 mm. longa, apiculata, interiora latiora 10-11 mm. longa, apice obtusa vel late rotundata et brevissime apiculata; corolla purpurea, infundibuliformis, 8-8.5 cm. longa, glabra, tubo supra calycem abrupte dilatato et medio 1.5 cm. lato, limbo circa 6 cm. lato; stylus 2-2.5 cm. longus; stamina valde inaequalia, filamentis parvis brevioris 2 cm. longis, longioris 3 cm. longis, antheris oblongis 5-6 mm. longis.

P a n a m a : Barro Colorado Island, Canal Zone, Barbour Point, March 8, 1932, *Otis Shattuck* 785 (Herb. Field Mus. No. 652503, type); shore north of Bangs House, Feb. 16, 1932, *R. H. Woodworth & P. A. Vestal* 579; near Drayton House, in marsh, sterile, *Woodworth & Vestal* 563.

From other *Ipomoeas* of the Canal Zone, this is distinguished at once by its narrow, hastate leaves. The large corollas must be unusually conspicuous.

Maripa panamensis Hemsl. — Standley (Fl. 27). A large woody vine; leaves short-petioled, oblong to ovate, glabrous or nearly so, coriaceous; flowers in stalked many-flowered cymes; corolla 3.5 cm. long, densely sericeous outside; fruit indehiscent.

Operculina codonantha (Benth.) Hallier? — New garden, *Wetmore & Abbe* 246; also collected at Frijoles, *Woodworth & Vestal* 684. A glabrous vine; leaves narrowly triangular-cordate, entire; peduncles greatly elongate, much thickened toward the apex; capsule 3-4 cm. wide, enclosed in the thick enlarged sepals. The plant is an addition to the North American flora, but there is some doubt regarding its specific position.

Rivea campanulata (L.) House. BATATILLA.—Standley (Fl. 27). A large vine, herbaceous or somewhat woody; leaves broadly cordate, entire, often purple beneath; corolla pink, 7-8 cm. long; capsule large and indehiscent, enclosed in the enlarged sepals.

BORAGINACEAE

Cordia alliodora (Ruiz & Pavón) Cham. LAUREL.—Standley (Fl. 27). A tall or medium-sized tree; leaves alternate, finely stellate-pubescent, entire; flowers small, white, fragrant, in large panicles; calyx 5 mm. long, 10-ribbed; fruit a small, white drupe. The nodes of the branches and inflorescence usually are enlarged and inhabited by tiny ants that bite severely. The wood is esteemed highly for construction and furniture. The tree is handsome with its profusion of white flowers, which persist upon the tree for a long time, finally turning brown.

Cordia bicolor A. DC.—Kenoyer & Standley (p. 156). A medium-sized tree; leaves large, almost sessile, oblong, acuminate, entire, covered beneath with a pale pubescence of minute appressed hairs; flowers small, in cymes, the calyx 4 mm. long, not striate.

Cordia ferruginea (Lam.) Roem. & Schult. — Kenoyer & Standley (p. 156). A shrub; leaves broadly ovate, acuminate, rather rough; flowers white, 3 mm. long, in long, slender, interrupted spikes.

Cordia nitida Jacq.—Shore near Termite House, *Wilson* 69; Gross Point, *Shattuck* 853; dock, *Shattuck* 813. A tree; leaves elliptic or oblong, entire, acute or acuminate, usually almost glabrous and smooth; flowers white, 5 mm. long, in small paniced cymes; drupe white, 1-1.5 cm. long. The species is an addition to the recorded flora of the Canal Zone.

Cordia sericicalyx A. DC.—Kenoyer & Standley (p. 156). A large tree; leaves thinly scabrous beneath; flowers small, white, in cymes, the calyx tubular-campanulate, 2 mm. long.

Heliotropium indicum L. FLOR DE ALACRÁN.—Edge of lake, *Starry* 249. A rough-hairy herb; leaves ovate or oval, acute, crenate; flowers small, purple, in recurved one-sided spikes; fruit of two 2-celled nutlets. Although one of the common weeds in many parts of Central America, this plant is infrequent in the Canal Zone.

Tournefortia bicolor Swartz. — Shore east of laboratory, *Wilson* 26; without locality, *Bailey* 342a. A woody vine or an arching shrub; leaves glabrous or nearly so, entire; flowers white, in one-sided recurved spikes; corolla 7 mm. long, its lobes broad and obtuse; fruit white, not lobed.

Tournefortia hirsutissima L.—Without locality, *Bailey* 621; near Fairchild Point, *Wilson* 44. Leaves densely hairy; branches tomentose or short-hirsute; calyx lobes acute or obtuse; corolla lobes broad, obtuse.

Tournefortia obscura A. DC. — Standley (Fl. 27). Frequent. Branches densely hirsute with long hairs; leaves densely hairy; calyx lobes long-acuminate; corolla lobes obtuse.

Tournefortia peruviana Poir.—Without locality, *Aviles* 114; *Bailey* 237; shore east of laboratory, *Wilson* 26; shore north of laboratory, *Woodworth & Vestal* 345; Barbour Point, *Shattuck* 807. Leaves glabrous; corolla 7 mm. long, its lobes triangular, acuminate; fruit 4-lobed.

VERBENACEAE

Aegiphila cephalophora Standley in Field Mus. Bot. 4:156 (1929).—Type from Shannon Trail, *L. A. Kenoyer* 607; known only from the island. A subscandent shrub; leaves lance-oblong, long-acuminate, entire, densely appressed-pilose

beneath; flowers in dense axillary headlike cymes 1-1.5 cm. broad; corolla white.

Petraea volubilis Jacq. VIUDA, FLOR DE MAYO, FLOR DE LA CRUZ.—Standley (Fl. 28). A large, woody vine; leaves opposite, almost sessile, oblong to obovate, rough; flowers in long, pendent racemes; calyx becoming greatly enlarged, blue. This is one of the most showy and beautiful vines of tropical America, somewhat suggestive of the *Wistaria* in its color effect.

Stachytarpheta cayennensis (L. Rich.) Vahl. VERBENA, COLA DE MILLO.—Called "porter weed" by the West Indians. Shore at French Lock site, *Woodworth & Vestal* 739. A coarse herb or a small shrub; leaves ovate or elliptic, crenate; flowers blue, in long, slender spikes, the calyx partly sunken in long pits in the rachis.

LABIATAE

Coleus Blumei Benth. COLEUS; POMPOLLUDA, CHONTADURA.—Standley (Fl. 28). Called "Jacob's coat" by the West Indians. A plant of Old World origin, planted at the laboratory.

Hyptis capitata Jacq. SUSPIRO DE MONTE.—Standley (Fl. 28). An erect herb; leaves opposite, lanceolate, coarsely toothed; flowers in dense globose heads 2 cm. in diameter or larger. A common weed of Central America.

Salvia occidentalis Swartz.—Standley (Fl. 28). A procumbent herb; leaves ovate or rhombic, acute or obtuse, crenate; flowers 3 mm. long, blue, in long, interrupted, spikelike racemes, the inflorescence very viscid. One of the most common dooryard and roadside weeds of Central America, the plant with a disagreeable odor. The sticky calyces adhere in an annoying manner to clothing, as well as to the feathers of birds.

SOLANACEAE

Browallia americana L. CHAVELITA DE MONTE.—Laboratory clearing, *Shattuck* 622; near the laboratory, *Woodworth & Vestal* 729. A low, puberulent annual; leaves petioled, ovate, entire; flowers solitary in the leaf axils, pedicellate, 2 cm. long, blue or royal purple.

Capsicum annum L. PEPPER; CHILE, AJÍ.—Standley (Fl.

28). Planted at the laboratory. This is the common, large-fruited pepper often grown in the North.

Capsicum frutescens L. BIRD PEPPER; CHILE. — Collected and determined by Bailey. Plants usually more or less shrubby; fruits very small and intensely pungent. Perhaps a native of Central America, although the plants usually grow as weeds in waste places.

Capsicum macrophyllum (HBK.) Standl. PINTAMORA DE MONTE.—Standley (Fl. 28). A coarse, bushy herb; leaves large, ovate to elliptic-oblong, almost glabrous; flowers small, greenish yellow, in dense clusters in the leaf axils; fruit globose, bright red, 5 mm. in diameter, juicy. Very unlike the true peppers in general appearance.

Cestrum panamense Standl.—Standley (Fl. 28). A slender shrub or small tree; leaves alternate, entire, lance-oblong, long-acuminate; flowers pale green, 1.5 cm. long, clustered in the leaf axils, the corolla slender-tubular, with small lobes; fruit a small, white berry.

Cyphomandra mollicella Standl.—A shrub or small tree, or often only a large, coarse herb; leaves dimorphous, the lower ones pinnately lobed, the upper broadly ovate and entire, cordate at the base, finely pubescent beneath or almost glabrous; flowers green, in one-sided racemes in the leaf axils; fruit a large berry. Listed previously from Barro Colorado (Kenoyer & Standley, p. 156) as *C. heterophylla* Donn. Smith.

Lycianthes Maxonii Standley in Jour. Wash. Acad. 17:14 (1927).—Type from Barro Colorado Island, *W. R. Maxon* 6808. The typical form of the species is known only from the island, but a variety occurs near Panama City. A slender shrub; leaves oblong-obovate to cuneate-obovate, acuminate, glabrous; flowers 1-3 in the leaf axils; calyx truncate, with 5 short, wartlike tubercles below the margin; corolla small, violet; fruit a red berry 1 cm. in diameter.

Markea panamensis Standley in Jour. Arnold Arb. 11:127 (1930).—Type collected between Armour House and the second bay north, *W. N. Bangham* 543. An epiphytic vine; leaves short-petiolate, oblanceolate-oblong or obovate-oblong, entire, glabrous, cuspidate-acuminate; flowers fasciculate or short-racemose at the tips of the branches; corolla yellow, funnelform, 1.5 cm. long; fruit baccate. Several collections

of the plant have been made recently on the island. It is known also from the Darién region.

Physalis pubescens L. GROUND-CHERRY; HIERBA DE SAPO, TOPETÓN.—Kenoyer & Standley (p. 156). A viscid, branched annual; leaves slender-petiolate, ovate, more or less cordate at the base, angled; flowers solitary in the leaf axils, the corolla bell-shaped, dull yellow, with a dark eye; fruit a globose berry, surrounded by the large and inflated calyx.

Solanum allophyllum (Miers) Standl. HIERBA DE GALLINAZO, HIERBA GALLOTA. — Standley (Fl. 28). A glabrous, branched annual a meter high or less; leaves dimorphous, some of them entire, others deeply lobed; flowers small, greenish, in few-flowered axillary racemes; fruit pendent, 2 cm. long, compressed laterally, striped with light and dark green.

Solanum asperum Rich. NARANJA CHINA. — Kenoyer & Standley (p. 156). Called "susumbers" by the Jamaicans. An unarmed shrub; leaves oblong-ob lanceolate, shining above, acute to attenuate at the base; flowers in large terminal cymes. Frequent in clearings.

Solanum bicolor Willd.—Standley (Fl. 28). An unarmed shrub; leaves large, elliptic or obovate; flowers in large terminal cymes, white; pubescence of the branches of fine, sessile, stellate hairs.

Solanum diversifolium Schlecht. FRIEGA-PLATO, HUEVO DE GATO.—Standley (Fl. 28). A tall, prickly shrub; branches finely stellate-tomentose; leaves petioled, usually unarmed, densely pubescent, angled or lobed; ovary glabrous. Called "susumba" by the West Indians. A common weedy shrub of Central America.

Solanum Donnell-Smithii Coult.—Kenoyer & Standley (p. 156). A woody vine, the branches armed with recurved prickles, densely beset with stiff hairs, these each with a tuft of hairs radiating from the tip; leaves angled, armed beneath with recurved prickles; berries orange, 2 cm. in diameter. Known in the Canal Zone only from Barro Colorado.

Solanum Hayesii Fernald. — Standley (Suppl. 127). A large shrub or small tree; leaves large and broad, entire, densely pubescent beneath, glabrate above, petioled, unarmed; stems unarmed; flowers white.

Solanum Kenoyeri Standley in Field Mus. Bot. 4:157 (1929).—Type from Lutz Trail, *L. A. Kenoyer* 515. Several more recent collections have been obtained on the island, and the species also grows elsewhere in the Canal Zone. An unarmed shrub; leaves very unequal, the larger ones oblong-elliptic, acuminate, entire, the smaller ones rounded; inflorescences axillary, umbel-like; corolla white, 5-6 mm. long.

Solanum nigrum L. BLACK NIGHTSHADE; PINTAMORA. — Kenoyer & Standley (p. 157). An erect branched annual; leaves ovate, sinuate-toothed or entire, pubescent or glabrate; flowers small, white or bluish; berries black.

Solanum parcebarbatum Bitter. HOJA HEDIONDA.—Standley (Fl. 28). A nearly glabrous, unarmed shrub; leaves chiefly elliptic, acute or acuminate, entire; flowers small, white, in umbels.

Solanum scabrum Vahl. FRIEGA-PLATO, ARAÑA-GATO. — Standley (Fl. 28). A large, woody vine, the branches armed with recurved prickles; leaves lanceolate and entire or broader and lobed, armed beneath with prickles; flowers white or dull purple. A pernicious plant, often forming impenetrable tangles in second-growth.

Solanum umbellatum Mill.—Without locality, *Bailey* 129. An unarmed shrub, the branches covered with stipitate, stellate hairs; leaves oblong to oblanceolate, entire, densely stellate-pubescent beneath; flowers white, in large stalked cymes; berries yellow.

SCROPHULARIACEAE

Scoparia dulcis L. ESCOBILLA AMARGA.—Standley (Fl. 28). Called "sweet broom" by the West Indians. An erect, nearly glabrous herb, densely branched; leaves alternate, ovate or lanceolate, toothed; flowers small, white, clustered in the leaf axils, the corolla densely hirsute within. One of the most abundant weeds of tropical America.

Stemodia parviflora Ait.—Standley (Fl. 28). A small, branched annual, densely pubescent; leaves petioled, broadly ovate, obtuse; flowers purple, densely clustered in the leaf axils, on very short pedicels.

Torenia crustacea (L.) Cham. & Schlecht.—Standley (Fl. 28). A small, glabrous annual with 4-angled stems; leaves

opposite, broad, obtuse, crenate or entire; flowers axillary, on long, slender pedicels; corolla 3-4 mm. long, purple or pale lilac.

BIGNONIACEAE

Adenocalymna flos-ardeae Pittier.—Standley (Fl. 28). A large, woody vine; leaves with 2-3 large, oblong to ovate leaflets, bearing numerous large yellowish glands beneath; flowers 6-7 cm. long, in small racemes; capsule oblong.

Amphilophium paniculatum (L.) HBK.—Standley (Fl. 28). A small, woody vine; leaflets rounded-cordate, green above, pale beneath and covered with minute scales; flowers pink and white, 3-4 cm. long; calyx apparently double, with internal appendages; capsule elliptic, compressed, with broadly winged seeds.

Anemopaegma punctulatum Pitt. & Standl. — Standley (Suppl. 128). A vine, glabrous or nearly so; leaflets 2, oblong to broadly ovate, entire; flowers yellow, 9-10 cm. long; capsule suborbicular, unarmed.

Arrabidaea pachycalyx Sprague. — Standley (Fl. 28). A large, woody vine, climbing over trees; leaflets 2-3, covered beneath with a minute whitish tomentum; flowers purple-pink, in large terminal panicles; pods linear, elongate. A handsome plant when in flower; easily recognized by the pale under surface of the leaflets.

Arrabidaea panamensis Sprague.—Standley (Suppl. 128). A small vine; leaflets green beneath, glabrous or sparsely pubescent; corolla lavender, 12 mm. long.

Callichlamys latifolia (A. Rich.) Schum.—Barbour Point, *Shattuck* 361. A climbing shrub; leaflets 3, large, elliptic, almost glabrous; flowers bright yellow, 8 cm. long, in short racemes; calyx inflated, 4 cm. long; capsule woody, oblong, 15 cm. long and 6 cm. wide.

Cydistia aequinoctialis (L.) Miers.—Standley (Fl. 28). A nearly glabrous, woody vine; leaflets 2, ovate or oblong; flowers pink or almost white, 5-8 cm. long, in terminal racemes or panicles; calyx minutely gland-dotted; capsule linear, 25-40 cm. long. The crushed leaves have the odor of garlic.

Jacaranda copaia Don. PALO DE BUBA.—Standley (Fl. 29). A tall forest tree; leaves very large and fernlike, opposite,

bipinnate, with numerous small toothed leaflets; flowers bluish, 3-4 cm. long, in large panicles; pods compressed, oval or rounded. One of the showiest of Central American trees.

Macfadyena uncinata (F. W. Meyer) DC.—Standley (Fl. 29). A slender, glabrous vine; leaflets 2, elliptic to lanceolate, long-acuminate; flowers pale yellow, 6 cm. long; capsule linear. Easily recognized by the tendrils, which terminate in sharp-pointed hooks, resembling the claws of a cat. Juvenile sterile plants of this species, with much reduced leaflets, often are abundant in lowland forest, creeping on tree trunks.

Martinella verrucosa (Standl.), comb. nov. (*Adenocalymna verrucosa* Standley in Field Mus. Bot. 4:323. 1929). The species was described from fruiting material collected by the writer near Tela, Honduras, and because of the unusual form of the fruit and the absence of flowers it was impossible to do more than guess at the genus to which it should be referred. Recent collections from Honduras and Panama have supplied excellent flowering specimens that justify the transfer of the species to the small genus *Martinella*. The curious, rather short, densely tuberculate capsules of the Central American plant are quite unlike those described for *Martinella obovata* (HBK.) Bur. & Schum., which in the FLORA BRASILIENSIS is reported from Costa Rica as well as from various regions of South America. The flowers, however, are very similar to those of the South American plant, and the foliage of the two is much alike. Trifid tendrils are supposed to be a special character of *Martinella*, but I have found no tendrils on the Central American specimens; with South American specimens of the genus the tendrils sometimes are quickly deciduous.

Martinella verrucosa is clearly distinct from *M. obovata*, and it is probable that the Costa Rican record relates to the former rather than to *M. obovata*. The thin, glabrous calyx varies in length from 1.5 to 2.5 cm. The corolla, described as purple or white tipped with lilac, is sparsely pilose outside and 5-6.5 cm. long. The following specimens have been examined:

H o n d u r a s : Lancetilla Valley, Dept. Atlántida, *Standley* 54891 (type), 53660, 55536; *Chickering* 157. P a n a m a (Barro Colorado Island): Wheeler Trail, *Starry* 151; cove north of laboratory, *Woodworth & Vestal* 324; lake shore near

laboratory, *Wetmore & Abbe* 56; without definite locality, *Bailey* 609; *Shattuck* 438.

Pachyptera foveolata DC. (*Adenocalymna foveolatum* Bur.)—Kenoyer & Standley (p. 157). A woody vine; leaflets 2-3, large, oblong to ovate, not glandular beneath; flowers 6-7 cm. long, in axillary or terminal racemes; capsule oblong.

Paragonia pyramidata (Rich.) Bur.—Standley (Fl. 29). A large vine; leaflets 2, oblong to elliptic, acutish, minutely lepidote beneath; flowers pink, 6-7.5 cm. long, in large, dense, terminal panicles; capsules linear, 35-40 cm. long.

Petastoma breviflorum Standley in Jour. Arnold Arb. 11:128 (1930).—Type from the lake shore south of the laboratory, *W. N. Bangham* 465. Known only from Barro Colorado; collected again recently: *Bailey* 509. A woody vine; leaflets 2, broadly elliptic, sparsely pilose beneath; corolla lilac or purple, 2 cm. long or less; capsule linear.

Petastoma patelliferum (Schlecht.) Miers.—Standley (Fl. 29). Leaflets elliptic to ovate, acuminate, pubescent or glabrate; flowers purple, 4 cm. long; corolla tomentose outside on the lobes; calyx broadly campanulate, spreading; capsules 20-30 cm. long.

Phryganocydia corymbosa (Vent.) Bur.—Standley (Fl. 29). A nearly glabrous vine; leaflets 2, elliptic to oblong; flowers bright pink, 6-9 cm. long, in terminal cymes; calyx spathaceous, deeply cleft on one side; capsules linear. Easily recognized by the spathaceous calyx. A common plant of the Canal Zone, strikingly handsome because of its showy pink flowers.

Pithecoctenium echinatum (Jacq.) K. Schum.—A woody vine; leaflets 2-3, ovate or rounded-ovate, finely lepidote and often pubescent; flowers white, 5 cm. long; capsule woody, oblong or elliptic, 15-20 cm. long, compressed, densely covered with hard spinelike tubercles. Called "peine de mico" (monkey comb) in Central America, in allusion to the curious and unique fruit. The genus has not been recorded previously for the Canal Zone, but this species is a common vine in the drier regions of Central America.

Tabebuia guayacan (Seem.) Hemsl. GUAYACÁN.—Standley (Fl. 29). A tall forest tree; leaves long-stalked, digitately compound, the leaflets stellate-tomentose, entire on adult trees but

often toothed on young plants; corolla bright yellow; calyx stellate-tomentose.

Tabebuia pentaphylla (L.) Hemsl. ROBLE, ROBLE DE SABANA.—Standley (Fl. 29). A large or medium-sized tree; leaflets minutely lepidote; corolla pink; calyx lepidote; capsule linear, 25-30 cm. long or larger. One of the most beautiful of Central American trees, abundant in many regions. The flowers vary from almost white to deep purple-pink, and in their variations and coloring imitate the Japanese cherries. The wood of this tree is highly valued for construction purposes and for making furniture.

Tanaecium Zetekii, sp. nov.—Pl. XIX.—Frutex scandens, ramulis crassiusculis obtuse vel subacute tetragonis et sulcatis brunnescentibus infra nodos depresso multiglandulosus, internodiis plerisque elongatis; folia vulgo ternata, cirrhis non visis, 3-6.5 cm. longe petiolata, foliolis membranaceis ellipticis vel oblongo-ellipticis 13-16 cm. longis et 6.5-10.5 cm. latis abrupte acutis vel acuminatis rarius sensim acutis basi latiuscule rotundatis et anguste breviter cordatis, lobis basilaribus circa 3 mm. infra insertionem petioli productis, supra in sicco viridibus vel subfuscentibus praesertim ad nervos minute puberulis vel glabris, costa venisque prominentibus gracillimis, subtus paullo pallidioribus minute sparse puberulis hinc inde glandulis parvis orbicularibus notatis, costa gracili elevata, nervis lateralibus utroque latere circa 12 ante marginem arcuato-conjunctis, petiolo recto minute puberulo apice late dilatato et infra apicem glandulis numerosis depressis insperso, petiolulis 1.5-5 cm. longis apice incrassatis; inflorescentiae axillares vel ad nodos defoliatos insertae, subsessiles, racemosae, dense multiflorae, rhachi usque ad 3 cm. longa, bracteis subulatis vel anguste triangularibus deciduis 1-1.5 mm. longis, pedicellis gracilibus pruinoso-puberulis 6-12 mm. longis apice dilatatis; calyx tubuloso-campanulatus, 7-8 mm. longus, truncatus et obscure remote repando-denticulatus, basi valde obliquus; corolla pro genere parva, extus dense puberula, tubo 6 cm. longo subcurvo basi 4-5 mm. lato infra medium dilatato et supra sensim ampliato fauce 1 cm. lato, lobis obovato-rotundatis circa 1 cm. longis undulatis basin versus glandulis numerosis fuscescentibus onustis, filamentis gracilibus 4-4.8 cm. longis glabris, antheris parvis curvis longipilosis, disco annulari tumido; fructus juve-

nilis anguste oblongus, basi et apice acutus densiuscule minute puberulus, breviter crasseque stipitatus, 7.5 cm. longus, 1.5 cm. latus.

P a n a m a : Barro Colorado Island, shore east of the laboratory, Feb. 3, 1932, *R. H. Woodworth & P. A. Vestal* 363 (Herb. Field Mus. No. 651874, type); at dock, October, 1931, *Shattuck* 270; Zetek Trail, *Shattuck* 512; without locality, *Aviles* 45; *Bailey* 655; shore near boat landing at the laboratory, vine with white flowers, December 23, 1931, *Wetmore & Abbe* 28.

From Central America there is known a single other species of this genus, *Tanaecium joroba* Swartz, with corollas twice as long as those of this Panama plant. In corolla size *T. Zetekii* is similar to the Brazilian *T. cyrtanthum* (Mart.) Bur. & Schum., which differs in most of its floral details, as well as in other characters.

GESNERIACEAE

Achimenes panamensis (Seem.) Hemsl.—Standley (Fl. 29). A weak, villous, perennial herb, 10-20 cm. high; leaves oblong to ovate, obtuse or acute; flowers white, 4 cm. long, inserted in the leaf axils, pedicellate, the corolla with a slender tube.

Besleria laxiflora Benth.—Kenoyer & Standley (p. 157). In forest. A slender herb or shrub a meter high; leaves long-petiolate, elliptic, almost entire, green and glabrous above, beneath pale and sparsely appressed-pilose; flowers orange, 2 cm. long, in stalked axillary umbels; ovary superior.

Codonanthe confusa Sandwith.—A small, epiphytic shrub, pendent or scandent, with glabrous foliage; leaves fleshy, elliptic to ovate, 2.5-5 cm. long, acute or obtuse; corolla 3 cm. long, white, often tinged with purple; ovary superior. This has been reported (Kenoyer & Standley, p. 157) from Barro Colorado as *Codonanthe calcarata* Hanst.

Columnea Billbergiana Beurl. — Pearson Trail, *Shattuck* 556. A small, epiphytic shrub; leaves opposite, lanceolate or oblong, 2-4 cm. long, sparsely appressed-pilose; flowers axillary, bright red, 4-5 cm. long; ovary superior. The specimens are juvenile, but referable to this species, if to any recorded from the isthmus.

Columnea purpurata Hanst.—Standley (Fl. 29). A terres-

trial shrub a meter high or larger; leaves oblong, oblique, 25-40 cm. long, villous-hirsute; flowers densely clustered in the leaf axils, covered with long, soft, red hairs.

Drymonia spectabilis (HBK.) Mart. — Standley (Fl. 29). An epiphytic shrub, often scandent; leaves thick, oblong to elliptic, usually dentate, very rough on the upper surface; calyx lobes broad, green, usually dentate; corolla 5 cm. long, dull dark red; ovary superior.

Kohleria tubiflora (Cav.) Hanst.—Standley (Fl. 29). A coarse perennial herb; leaves ovate to oblong, crenate, villous, often red or purple beneath; flowers axillary, the tubular, densely villous, bright red corolla 2.5 cm. long; ovary partly inferior. A conspicuous plant because of its brilliant flowers.

Tussacia Friedrichsthaliana Hanst.—Standley (Fl. 29). A low, weak herb, growing usually in moist forest; leaves oblong to ovate, crenate, on winged petioles; flowers large, orange or yellow; calyx green; ovary superior.

LENTIBULARIACEAE

Utricularia mixta Barnhart.—Standley (Fl. 29). A small, floating, aquatic plant; leaves dissected into threadlike segments; flowers small, yellow, on slender peduncles arising above the water; corolla spurred.

ACANTHACEAE

Aphelandra Sinclairiana Nees. — Standley (Fl. 29). A shrub with large, thin leaves; flowers in dense, bracted, panicled spikes, the large, obtuse bracts bright orange, the long, narrow corollas bright red. A striking and showy plant, the handsomest of all the Central American members of the genus.

Aphelandra tetragona (Vahl) Nees.—Standley (Fl. 29). A stout shrub; bracts small, acuminate, entire, closely appressed, green; corolla bright red.

Beloperone graciliflora, sp. nov.—Pl. XX.—Caules herba-cei, elongati, gracillimi, novelli sparse minute incurvo-puberuli cito glabrati, internodiis elongatis; folia membranacea, laete viridia, petiolata petiolo gracili 5-10 mm. longo; lamina lanceolata vel lanceolato-oblonga, 5.5-11 cm. longa et 1.5-3.5 cm. lata, acuminata vel longe acuminata, basi acuta vel attenuata, gla-

bra, integra, utrinque raphidibus acicularibus minutis densissime conspersa, nervis lateralibus utroque latere circa 7 arcuatis; inflorescentiae terminales, paniculatae, pauciflorae, circa 8 cm. longae, sessiles vel breviter pedunculatae, laxae, ramis gracillimis sparse puberulis vel glabratis, bracteis ut bracteoli linearibus viridibus 5-7 mm. longis, pedicellis usque ad 1.5 cm. longis; sepala linearilanceolata, 2 cm. longa et 3 mm. lata, longe attenuata, extus sparse strigosa, erecta; corolla lutea, extus sparse breviter pilosa, tubo gracili 4 cm. longo 4 mm. crasso supra vix dilatato, limbo bilabiato, labio inferiore patente 2-2.5 cm. longo profunde aequaliter trilobo, lobis ovalibus apice late rotundatis, superiore galeiformi erecto circa 2 cm. longo versus apicem angustato; stamina fertilia 2, labio superiori fere aequilonga, antherae loculis inaequaliter insertis connectivo lato separatis fere 3 mm. longis basi calcare albo crassiusculo appendiculatis; capsula sessilis, oblonga, 1.5 cm. longa, acutiuscula, glabra, basi obtusa, seminibus globosis laevibus glabris.

P a n a m a : Barro Colorado Island, Drayton Trail, December 17, 1931, *Otis Shattuck* 602 (Herb. Field Mus. No. 650145, type); March 7, 1932, *Shattuck* 602a; end of Drayton Trail, December 31, 1931, *Wetmore & Abbe* 107.

According to notes of the collectors, apparently a large and more or less clambering plant.

Blechnum panamense Lindau.—Standley (Fl. 29). A slender, erect perennial; leaves linear-lanceolate, long-attenuate at the base. A forest plant.

Blechnum pyramidatum (Lam.) Urban.—Standley (Fl. 29). A weak, usually decumbent, perennial herb; leaves opposite, petiolate, ovate or oblong, entire, glabrous or nearly so; flowers in dense, bracted spikes, the broadly ovate bracts green; corolla pale purple, about equaling the bracts; stamens 4. One of the most common tropical weeds.

Chaetochlamys panamensis Lindau.—Standley (Fl. 29). A slender, erect, perennial herb; leaves petioled, glabrous; flowers purple, 3 cm. long or larger, in dense terminal heads, the bracts elongate, linear, densely white-hirsute; stamens 2.

Mendoncia retusa Turrill.—Standley (Fl. 29). A slender, herbaceous vine, climbing on trees or shrubs; leaves opposite, long-petioled, elliptic or oval, caudate-acuminate, almost glabrous; flowers axillary, the corolla white with purple veins;

fruit a black, plumlike drupe almost 2 cm. long. The plants of this genus have little superficial resemblance to most other members of the family.

Trichanthera gigantea (HBK.) Humb. & Bonpl. PALO DE AGUA.—Ravine west of the laboratory, *Woodworth & Vestal* 731; near the laboratory clearing, *Woodworth & Vestal* 682. A small tree, growing along streams or in wet forest; leaves ovate or elliptic, nearly glabrous; flowers in terminal, usually one-sided thyrses or corymbs, the brown-red corolla 4 cm. long, the limb sericeous outside.

RUBIACEAE

Alibertia edulis (L. Rich.) A. Rich. LAGARTILLO, TROMPITO.—Standley (Fl. 29). Called "wild guava" by the West Indians. A shrub; leaves opposite, entire, lance-oblong, glabrous, with stipules; flowers white, dioecious, sessile in terminal clusters; fruit globose, baccate, 2.5 cm. in diameter. Young seedling plants, which are plentiful in the moist forest, have their narrow leaves mottled with purple and pink.

Alseis Blackiana Hemsl. — Without locality, *Bailey* 469; Barbour-Lathrop Trail, *Shattuck* 52; Wheeler Trail, *Shattuck* 822. A tree; leaves thin, obovate-oblong; flowers small, white, in long, slender spikes; fruit a small capsule.

Amaioua corymbosa HBK. MADROÑO. — Standley (Suppl. 129). A shrub or small tree; leaves oval or elliptic, acuminate; stipules united into a conic, deciduous cap; flowers white, dioecious, 1 cm. long, in terminal cymes; fruit oval, many-seeded, black, 1.5 cm. long. Elsewhere in the Zone this plant is known only from Ancón Hill.

Bertiera guianensis Aubl.—Standley (Fl. 30). A slender shrub; leaves almost sessile, lance-oblong, glabrate; flowers very small, in secund cymes, these arranged in a long, narrow panicle; fruit blue, globose, juicy, 3-4 mm. in diameter.

Borreria laevis (Lam.) Griseb.—Standley (Fl. 30). A low annual or perennial with elliptic leaves, the stipules with bristles; flowers small, white, in dense terminal and axillary heads; fruit dry, each cell with a single transversely sulcate seed. A common weed of tropical America.

Borreria latifolia (Aubl.) K. Schum.—Standley (Fl. 30).

Usually prostrate; leaves yellowish green; flowers in dense, sessile heads.

Borreria ocimoides (Burm.) DC.—Standley (Fl. 30). A slender, erect annual; leaves elliptic or lanceolate; flower clusters sessile, only 6 mm. in diameter, chiefly axillary.

Borreria suaveolens Meyer. (*B. tenella* Schlecht. & Cham.).—Gross Point, *Shattuck* 421. An erect perennial; leaves linear or narrowly lanceolate; flower clusters chiefly terminal, 1 cm. in diameter or larger.

Cephaelis ipecacuanha (Brot.) Rich. IPECAC; RAICILLA.—Standley (Fl. 30). A small shrub about 30 cm. high, simple, glabrate; leaves oblong, almost sessile, the stipules dissected into filiform lobes; flowers small, white, in a single, terminal head; fruit juicy, containing 2 ribbed, slightly twisted nutlets. The slender cordlike knotted roots of this plant are one of the sources of the drug ipecac.

Cephaelis tomentosa (Aubl.) Vahl.—Standley (Fl. 30). A densely hirsute shrub 1.5-3 meters high; flowers yellow, in large, dense, long-stalked heads, each head subtended by 2 broad, bright red bracts; fruits bright blue. A common shrub, showy because of its brilliant flower heads. It is a plant that no amateur collector can resist, and probably has been collected more amply than any tropical American member of the Rubiaceae. Certainly, no further specimens of it are needed.

Cosmibuena paludicola Standl. — Kenoyer & Standley (p. 157). A small, glabrous tree, sometimes apparently epiphytic; leaves oval or obovate, thick and fleshy, rounded at the apex; flowers few, terminal; calyx cylindric, circumscissile; corolla white, the tube 6-6.5 cm. long, the lobes 2.5 cm. long; fruit capsular.

Coussarea impetiolearis Donn. Smith.—Without locality, *Bailey* 527, 326; Armour Trail, *Starry* 50; Fairchild Point, *Shattuck* 135; cut-off from Wheeler to Pearson Trail, *Wetmore & Abbe* 18. A small tree; leaves almost sessile, elliptic or oblong, acuminate, large, glabrous; flowers paniculate, the branches of the panicle pubescent; corolla white, 2.5 cm. long; fruit juicy, almost 2 cm. long, verrucose, containing 2 nutlets. This genus is an addition to the flora of the Canal Zone.

Diodia denudata Standl. — Without locality, *Aviles* 94. A perennial herb; leaves ovate, conspicuously nerved; flowers

minute, white, the globose heads arranged in long, almost naked spikes; capsule 1 mm. long.

Faramea occidentalis (L.) Rich. HUESITO.—Standley (Fl. 30). A glabrous shrub; leaves elliptic or oblong, acuminate, acute at the base; flowers white, sweet-scented, corymbose; corolla with a slender tube and spreading lobes; fruit juicy, 1-seeded, the seed horizontal.

Faramea Zetekii, sp. nov. — Pl. XXI. — Frutex omnino glaber, ramulis crassis olivaceis vel fuscis, novellis interdum compressis, internodiis elongatis; stipulae non vaginantes, rotundato-ovatae, 5-6 mm. longae, abrupte in aristam rigidam 6-7 mm. longam abeuntes, persistentes; folia breviter petiolata petiolo crasso submarginato 4-6 mm. longo, majuscula, crasse membranacea, opposita; lamina oblongo-elliptica vel oblonga, 16-19 cm. longa et 6-9 cm. lata, apice obtusa vel acutiuscula et abrupte caudata acumine angusto circa 1 cm. longo, basi acuta, supra viridis, costa nervisque elevatis, subtus concolor, costa elevata, nervis lateralibus utroque latere circa 13 angulo lato adscendentibus leviter arcuatis prominentibus prope marginem junctis, venulis prominulis laxè reticulatis; inflorescentia terminalis, sessilis, corymbiformis, pauciflora, 6 cm. longa, basi trichotoma, floribus cymosis, bracteis obsoletis, pedicellis crassis rectis 5-7 mm. longis; hypanthium late obovoideum, 2 mm. longum, calyce late campanulari 2 mm. longo truncato 3.5-4 mm. lato; corolla alba, tubo 11-15 mm. longo gracili supra vix dilatato fauce 2.2 mm. lato, lobis 4 patentibus fere 1 cm. longis anguste lanceolatis attenuatis intus glabris; antherae semiexsertae.

P a n a m a : Barro Colorado Island, shore of cove, west of Fuertes House, Feb. 21, 1932, *R. H. Woodworth & P. A. Vestal* 641 (Herb. Field Mus. No. 652425, type).

According to the collectors, the flowers are very fragrant. The proposed species is quite unlike any of those known from Central America, but it approaches some of the Colombian species, although not agreeing in all characters with any of them.

Genipa americana L. JAGUA.—Standley (Suppl. 129). A medium-sized tree; leaves large, obovate, glabrous; flowers white or yellowish, in terminal cymes; fruit baccate, globose, 5-7 cm. in diameter, containing numerous, large, compressed

seeds. The fruit is edible but not palatable. Its juice produces upon linen an indelible brownish or blackish stain. It was much used by some of the American aborigines for painting their bodies.

Genipa caruto HBK. JAGUA. — Similar, but the leaves densely pubescent beneath. Perhaps only a variety of *G. americana*.

Geophila herbacea (Jacq.) K. Schum.—Standley (Fl. 30). A creeping, perennial herb; leaves small, long-petioled, broadly cordate, rounded or very obtuse at the apex, glabrous or nearly so; flowers small, white, in stalked axillary heads; fruit juicy, bright red or black, containing 2 nutlets.

Geophila macropoda (Ruiz & Pavón) DC. — Zetek Trail, *Starry* 31. Similar, but the leaves cordate-ovate, acute or acuminate. The species has been recorded previously only from Peru.

Guettarda foliacea Standl.—Standley (Fl. 30). A slender shrub; leaves thin, broad, 10-16 cm. long, appressed-pilose, slender-petiolate; flowers small, greenish white, in stalked axillary cymes; fruit a drupe with scant flesh.

Hamelia axillaris Swartz.—Standley (Suppl. 129). A slender shrub; leaves opposite, almost glabrous, ovate; flowers yellow, in few-flowered cymes; calyx lobes oblong; fruit a 5-celled berry.

Hamelia nodosa Mart. & Gal.—Standley (Fl. 30). Leaves verticillate, glabrate; cymes many-flowered; corolla tubular, 2 cm. long or less, orange-red.

Hemidiodia ocimifolia (Willd.) K. Schum.—Standley (Fl. 30). An herb with elongate stems; leaves lanceolate, the stipules furnished with bristles; flowers small, white, clustered in the leaf axils; capsule 2-seeded. A common weedy plant.

Isertia Haenkeana DC. CANELITO.—Standley (Fl. 30). A stout shrub; leaves obovate, 20-50 cm. long; flowers in large, dense, terminal panicles; corolla tubular, 2-3.5 cm. long, bright yellow tinged with red; fruit baccate, small, at first red, becoming black when ripe, containing numerous, minute seeds. A showy and handsome plant.

Ixora coccinea L. BUQUET DE NOVIA.—Standley (Fl. 30). A shrub with small, cordate leaves and dense clusters of red flow-

ers, planted at the laboratory. An Old World species, planted generally for ornament in Central America.

Macrocnemum glabrescens (Benth.) Wedd. — Kenoyer & Standley (p. 157). A small or medium-sized tree; leaves obovate, glabrate; flowers pink, in dense panicles, the corolla with a slender tube and broad, spreading lobes; fruit a small capsule with winged seeds. An attractive tree because of its agreeably colored flowers.

Manettia coccinea (Aubl.) Willd. — Laboratory clearing, *Shattuck* 159; near Wheeler Trail, *Wetmore & Abbe* 16. A slender, herbaceous vine, often forming dense tangles; leaves small, ovate, acuminate; flowers axillary, the tubular corolla 2 cm. long, pale red; fruit capsular.

Oldenlandia corymbosa L. — Standley (Fl. 30). A small, slender annual; leaves linear; flowers minute, white or pinkish, in few-flowered, axillary cymes; fruit a small capsule.

Palicourea guianensis Aubl.—Standley (Fl. 30). A shrub; leaves large, ovate, opposite, glabrous or nearly so; stipules bilobate, the lobes broad, obtuse; flowers in dense, terminal, thyriform panicles, the branches red or orange; corolla tubular, yellow; fruit small, juicy, black or purple, containing 2 small nutlets.

Pentagonia macrophylla Benth. HOJA DE MURCIÉLAGO. — Standley (Fl. 30). A low or tall shrub, simple or sometimes branched; leaves very large, obovate, petioled, glabrous or sparsely appressed-pilose, when dry finely striolate between the veins; flowers in dense axillary cymes furnished with large, red bracts; corolla yellowish white.

Pentagonia pubescens Standl.—Standley (Fl. 30). Similar, but the leaves finely velvety-pubescent. Both species are common and characteristic forest shrubs.

Posoqueria latifolia (Rudge) Roem. & Schult. BORAJÓ, BOCA VIEJA, FRUTA DE MONO.—Standley (Fl. 30). A glabrous shrub or small tree; leaves thick, dark green, oval or oblong; flowers white, in terminal corymbs, the slender, terete corolla tube 12-16 cm. long; fruit large, yellow, resembling a small orange, fleshy, containing numerous, large seeds. An exceedingly showy tree when in flower.

Psychotria brachiata Swartz.—Standley (Fl. 30). Leaves short-petioled, obovate or obovate-oblong, acuminate, nar-

rowed to the base, glabrous or nearly so; inflorescence a narrow, terminal panicle, the sessile flowers subtended by conspicuous green bracts; fruits small, deep prussian blue, containing 2 nutlets. The species of *Psychotria* are mostly shrubs of one to two meters. They form an important part of the undergrowth in deep forest.

Psychotria calophylla Standl.—Standley (Fl. 30). Stipules thin and brown, early deciduous; leaves coriaceous, broadly rounded and apiculate at the apex; inflorescence a sessile panicle, branched from the base.

Psychotria carthaginensis Jacq.—Kenoyer & Standley (p. 157). Leaves obovate-oblong, thin, glabrous beneath or nearly so; stipules thin and brown; inflorescence a pedunculate panicle.

Psychotria chagrensis Standl.—Standley (Fl. 30). Leaves obovate-elliptic, small and thin, chiefly 4-6 cm. long; stipules thin and brown; flowers in dense heads surrounded by brown scarious bracts.

Psychotria cuspidata Bredem.—Standley (Fl. 30). Leaves oblong-ovate or elliptic, cuspidate-acuminate, glabrous; stipules persistent; panicles small, terminal; corolla white, 4 mm. long; fruit yellow, turning black.

Psychotria emetica L. f. RAICILLA MACHO, RAICILLA. — Standley (Fl. 30). A low, simple shrub, seldom more than 60 cm. high; leaves oblong-elliptic or oblong-obovate, short-petiolate, acute, puberulent beneath; flowers subracemose, axillary; fruit blue. The roots yield a kind of ipecac.

Psychotria granadensis Benth.—Standley (Fl. 30). Leaves elliptic-oblong, glabrous or sparsely puberulent beneath; stipules brown, thin; panicles sessile, the branches glabrous or puberulent.

Psychotria grandis Swartz.—Standley (Fl. 30). A shrub or small tree, glabrous almost throughout; stipules very large, ovate, green, persistent; leaves mostly oblong-obovate; panicles large, pedunculate; fruit red.

Psychotria hebeclada DC.—Kenoyer & Standley (p. 157). A low, slender shrub; leaves densely pubescent, thin; panicles erect, terminal, small and narrow; calyx conspicuously lobate; corolla pubescent outside; fruit purple-black.

Psychotria horizontalis Swartz.—Standley (Fl. 30). Leaves glabrous or sparsely puberulent beneath; stipules thin, brown; calyx lobes lance-linear.

Psychotria involucrata Swartz.—Standley (Fl. 30). Stipules persistent; inflorescences small, dense, few-flowered, the bracts longer than the corolla, acute, flat; fruit black.

Psychotria limonensis Krause.—Standley (Fl. 30). A large shrub; leaves broadly elliptic, mostly 8-12 cm. wide, glabrous; stipules brown, deciduous; panicles large, pedunculate, the flowers pedicellate.

Psychotria marginata Swartz.—Standley (Fl. 30). Common. A nearly glabrous shrub; leaves oblong-ob lanceolate, 4-5 cm. wide, long-tapering to the base; stipules brown; panicles pedunculate, the flowers white, very small; pedicels longer than the fruits.

Psychotria patens Swartz. GARRICILLO.—Standley (Fl. 30). A slender, glabrous shrub; stipules small, green, persistent bilobate; leaves ovate-oblong, rounded or obtuse at the base; panicles narrow, small; corolla glabrous; fruit pale blue or almost white.

Psychotria Pittieri Standl.—Standley (Fl. 30). A small, dense shrub; leaves small, pubescent; stipules persistent; panicles small, reflexed; corolla pubescent outside; fruit blue.

Psychotria racemosa (Aubl.) Willd.—Standley (Fl. 30). Leaves elliptic or oblong-elliptic, short-acuminate, decurrent at the base, glabrous or pubescent beneath; panicles small and dense; fruit 5-celled. Easily recognized by the 5-celled fruit, that of other species being 2-celled.

Psychotria rufescens Humb. & Bonpl. (*P. micrantha* HBK.).—Standley (Fl. 30). Leaves oblong-elliptic, densely brown-pubescent beneath; stipules brown, deciduous; flowers sessile, in pedunculate panicles.

Psychotria uliginosa Swartz.—Without locality, *Bailey* 543; Wheeler Trail, *Starry* 90. Plants simple, about 1 meter high, herbaceous or suffrutescent; leaves large, broad, succulent, pale beneath; inflorescences axillary; fruit bright red.

Randia armata (Swartz) DC. ROSETILLO.—Standley (Fl. 31). A shrub, armed with stout, straight spines, these mostly in 4's at the ends of the short branchlets; flowers 2.5 cm. long or larger, white, with a slender tube and large, broad lobes;

fruit globose, 2.5-3.5 cm. in diameter, containing black pulp and numerous large seeds. The pulp is edible, but it is of poor flavor and singularly repulsive appearance.

Randia formosa (Jacq.) K. Schum.—Kenoyer & Standley (p. 158). A small, unarmed tree; flowers large, white, the slender corolla tube 6-11 cm. long; fruit oblong.

Randia lasiantha Standl.?—Snyder-Molino Trail, *Starry* 8. Specimens in fruit only, but probably referable to this species, in which the corolla is much larger, with a much elongate tube that is densely sericeous, rather than glabrous, outside.

Rudgea cornifolia (Humb. & Bonpl.) Standl. (*R. fimbriata* [Benth.] Standl.).—Standley (Fl. 31). A glabrous shrub; leaves subsessile, oblong-obovate, long-acuminate; stipules persistent, lacinate-dentate; inflorescence cymose-paniculate, sessile, the small flowers white; fruit fleshy, containing 2 large nutlets.

Sabicea villosa Roem. & Schult. var. **adpressa** (Wernham) Standl.—Without locality, *Aviles* 22; shore, near end of Chapman Trail, *Woodworth & Vestal* 524. An herbaceous or suffrutescent vine; leaves ovate or oblong, acute or acuminate, pubescent; flowers small, white, in dense, headlike, axillary clusters; fruit a red or dark purple berry. This plant was listed in the FLORA OF THE PANAMA CANAL ZONE as *S. hirsuta* HBK.

Spermacoce glabra Michx.—In water, cove south of French Lock site, *Woodworth & Vestal* 476. A slender, glabrous annual; leaves lanceolate or linear-lanceolate; stipules setiferous; flowers minute, white, in axillary clusters; capsule 2-celled, 2-seeded.

Tocoyena Pittieri (Standl.) Standl., comb. nov. (*Posoqueria Pittieri* Standley in Jour. Wash. Acad. 18:167. 1928).—Barro Colorado Island, April, 1927, *Zetek*; Wheeler Trail, *Starry* 131; without locality, *Aviles* 14. The type was collected near the hydrographic station on the Trinidad River, Canal Zone, *Pittier* 6635. A tree, glabrous throughout; leaves broadly obovate, short-petiolate; flowers yellow, in dense, terminal corymbs, the slender corolla tube 4.5-8 cm. long or larger; fruit yellow, 7-8 cm. in diameter, with a thick rind, the interior "a thick gummy mass with many large seeds and a penetrating odor."

This is the first true *Tocoyena* to be reported from North America, but the genus is represented in South America by a substantial number of species inhabiting the tropical lowlands. The unfortunate reference of the plant to *Posoqueria* was caused by the fact that I was unfamiliar with the group *Tocoyena*, although examination of the material should have forced its reference there.

A closely related but apparently distinct species, occurring in Costa Rica, is ***Tocoyena obliquinervia*** (Standl.), comb. nov. (*Posoqueria obliquinervia* Standley, l. c.).

Uncaria tomentosa (Willd.) DC. (*Ourouparia tomentosa* K. Schum.).—Standley (Fl. 31). A large, woody vine, armed with stout, hooked spines; leaves oval or ovate, acute; flowers small, yellowish, arranged in very dense, globose heads. The flower heads are much like those of the northern Button-bush (*Cephalanthus*), to which this vine is closely related.

Warscewiczia coccinea (Vahl) Klotzsch.—Kenoyer & Standley (p. 158). A small tree with large, thin, obovate leaves; flowers in small cymes, these arranged in long, narrow panicles; one calyx lobe in one flower of each cyme expanded into a large, oblong or elliptic, bright red, leaflike blade. The tree is one of the handsomest and most showy of all tropical America, because of the brilliantly colored calyx lobes.

CUCURBITACEAE

Anguria Warscewiczii Hook. f. — Standley (Fl. 31). A slender, glabrous, herbaceous vine; leaves pedately 3-foliolate, the terminal leaflet entire or sinuate, the lateral ones deeply 2-lobed; flowers 1 cm. long, in long-stalked spikes, the tubular calyx green, the petals bright red.

Cayaponia Poeppigii Cogn.—Standley (Fl. 31). Similar, but the leaves larger, often 25 cm. wide; corolla 15 mm. long; fruit globose, 6-seeded.

Cayaponia racemosa (Swartz) Cogn. — Without locality, *Bailey* 577; edge of clearing, Wheeler Trail, *Starry* 162. A large, coarse vine with rough, lobed leaves; flowers small, greenish yellow, racemose, the corolla 5 mm. long or smaller; fruit oval, 1.5 cm. long, 2-3-seeded, indehiscent.

Cucurbita Pepo L. SQUASH; CALABAZO, SAPUYO.—Standley

(Fl. 31). Planted at the laboratory. A plant of American origin.

Gurania coccinea Cogn. BIEN-TE-VEO. — Standley (Suppl. 129). Densely hairy, as in other species; leaves pedately 3-foliolate.

Gurania Seemanniana Cogn. BEJUCO PICADOR. — Standley (Fl. 31). A rather small, herbaceous vine; leaves large, deeply lobed; flowers bright red, the inflorescence long-stalked. The long hairs of the leaves sometimes penetrate the flesh, causing considerable irritation.

Guarania suberosa Standley in Jour. Wash. Acad. 15:461 (1925).—Type from Barro Colorado Island, *Standley* 31461. A slender vine, climbing on tall trees, the woody stems covered with thick, corky ridges; inflorescences bright red, borne on the stems near the ground; leaves on the younger branches, high up in the supporting tree. Among the most recent collections of this species are several with leaves, which had not been obtained previously. The leaves are long-petiolate, the blades 20 cm. long or less, deeply cordate and 3-nerved at the base, shortly hispid-hirsute, especially on the upper surface, 3-lobate to below the middle; lobes rather narrow and long-acuminate, remotely repand-denticulate, the middle one somewhat constricted near the base. Except for another closely related species growing in Costa Rica, this is the only North American cucurbit having true wood. The wood is remarkable for its extraordinarily large vessels.

Luffa cylindrica (L.) Roem. SPONGE GOURD; CALABAZO. — Standley (Fl. 31). A showy vine, the large staminate flowers in long racemes; fruits smooth, cylindric, 30-60 cm. long, the interior filled with a coarse, fibrous mass resembling a marine sponge. A native of the Old World tropics, often naturalized in tropical America.

Melothria guadalupensis (Spreng.) Cogn. SANDILLITA. — Standley (Fl. 31). A very slender, small vine with small, angulate or shallowly lobed, rough leaves; flowers very small, yellow, the staminate in racemes, the pistillate solitary. The green fruits, 1.5-2.5 cm. long, suggest a diminutive watermelon; they have the odor of cucumber. The West Indians eat the fruits, which they call "wild cucumbers."

Momordica Charantia L. BALSAM PEAR; BALSAMINO. — Called "surcy" by the Barbadians. Edge of lake, *Starry* 251; also collected by Bailey. A slender but often much elongated vine; leaves thin, deeply 5-lobed; flowers small, yellow, solitary on elongate pedicels; fruit oblong or fusiform, pointed, tubercled, bright orange, splitting open by 3 valves and exposing the red pulp in which the large seeds are imbedded.

Posadaea sphaerocarpa Cogn. BRUJITO. — Standley (Fl. 31). A coarse, villous vine; leaves large, rough, deeply cordate, remotely dentate or deeply lobed; flowers rather large, yellow; fruit globose, gourdlike, 10 cm. in diameter.

Sicydium tamnifolium (HBK.) Cogn.—Standley (Fl. 31). A slender vine with fine, soft pubescence; leaves thin, broadly cordate, entire or nearly so; flowers minute, greenish yellow, in large, lax panicles; fruit globose, 1-seeded, 6 mm. in diameter, black at maturity.

LOBELIACEAE

Centropogon surinamensis (L.) Presl. — Without locality, *Aviles* 81. A coarse herb, often clambering, succulent, almost glabrous; leaves lanceolate, alternate, subentire; flowers rose or pale red, 5-6 cm. long, the tubular corolla 2-lipped; fruit baccate.

COMPOSITAE

Baccharis trinervis (Lam.) Pers. SANTA MARÍA.—Standley (Fl. 31). A shrub, erect or with long, arching branches; leaves alternate, lance-oblong, 3-nerved, entire, glabrate; flower heads small, dirty white, rayless, in compact, rounded, terminal corymbs.

Baltimora recta L.—Kenoyer & Standley (p. 158). A large, erect, branched annual; leaves opposite, petiolate, broadly ovate, crenate, rough-pubescent; heads 5 mm. high, with yellow rays, the bracts few and broad; pappus a short, cuplike crown.

Bidens pilosa L. ARPONCITO, CADILLO, SIRVULACA.—Standley (Fl. 31). Called "Spanish needles" by the West Indians. A branched annual; leaves opposite, pinnately dissected; heads without rays, the bracts in 2 distinct series; achenes long and slender, terminated by barbed awns. One of the common weeds of tropical America.

Chaptalia nutans (L.) Polak.—Standley (Fl. 31). A perennial herb with a basal rosette of leaves, these more or less lyrate-lobed and densely white-tomentose beneath; scapes bearing a single head 2-3 cm. long, the rays white to red-purple. In habit the plant resembles a Dandelion.

Clibadium surinamense L. ZALAGUEÑA, MASTRANZO DE MONTE.—Kenoyer & Standley (p. 158). A shrub; leaves opposite, short-petioled, ovate-oblong, crenate, densely rough-pubescent; heads 5 mm. long, subglobose, white, in small terminal corymbs; bracts broad, thin, rounded; pappus none.

Eclipta alba (L.) Hassk.—Standley (Fl. 31). An erect or prostrate, strigose herb; leaves opposite, linear to oblong-lanceolate, inconspicuously toothed; heads 6-9 mm. broad, solitary or in pairs in the leaf axils, short-pedunculate, with very small, whitish rays; achenes glabrous, the pappus a low, denticulate crown. One of the most widely distributed of tropical weeds.

Elephantopus mollis HBK. — Standley (Suppl. 129). An erect, perennial herb; leaves alternate, oblong or obovate, crenate, soft-pubescent; heads white or purple, with 5 or fewer flowers, in globose, bracted heads at the ends of the few branches; pappus of a few bristles dilated at the base.

Emilia sonchifolia (L.) DC.—Standley (Fl. 31). A small, erect annual; leaves alternate, the stem leaves lyrate-lobed, the upper with clasping bases; heads pale purple or pink, rayless, 1 cm. high, in lax corymbs; pappus of soft, white bristles. Naturalized from the Old World tropics.

Erechtites hieracifolia (L.) Raf. TABAQUILLO. — Standley (Fl. 31). A coarse, erect, somewhat pubescent annual; leaves alternate, lanceolate, coarsely toothed, the upper sessile; heads greenish, rayless, 1.5 cm. high, in small corymbs; pappus of soft, white bristles.

Erigeron bonariensis L. TABAQUILLO.—Standley (Fl. 31). A coarse, erect annual; leaves alternate, mostly linear, serrate or entire; heads 4-5 mm. high, with inconspicuous rays, whitish; pappus of slender, tawny bristles. A weedy plant, like the next species.

Erigeron spathulatus Vahl. — Standley (Fl. 31). Stem leaves spatulate or obovate, coarsely crenate.

Eupatorium Billbergianum Beurl.—Without locality, *Shattuck* 655; shore, east of landing, *Wetmore & Abbe* 87; Fairchild Trail, *Wetmore & Abbe* 77. A slender shrub 2.5 meters high; leaves opposite, lanceolate, long-acuminate, finely serrate, glabrate; heads white, small, campanulate. The species is new for the Canal Zone flora.

Eupatorium elatum Steetz. — Shore near Drayton House, *Woodworth & Vestal* 600; Gross Point, *Shattuck* 852. A large herb; leaves sessile, acuminate, finely pubescent beneath, at least the upper ones with margined, petiole-like bases; heads in large, lax panicles.

Eupatorium macrophyllum L. — Standley (Fl. 31). A coarse herb, usually a meter high or larger; leaves broadly ovate, softly pubescent; heads greenish white, 6-8 mm. high, campanulate, in paniced corymbs. A common weed of Central America.

Eupatorium microstemon Cass. — Standley (Fl. 31). A small, weak annual; leaves petiolate, broadly ovate; heads purple, 5 mm. high, campanulate, short-pediceled.

Eupatorium odoratum L. PALECA, HIERBA DE CHIVA. — Standley (Fl. 31). Called "Christmas bush" by the West Indians. A shrub, often with long, clambering branches; leaves rhombic-ovate or deltoid, coarsely toothed or rarely entire; heads 10-12 mm. long, cylindric, lavender or almost white. One of the most abundant weedy shrubs of Central America.

Eupatorium Sinclairii Benth.—Standley (Fl. 31). A weedy annual; leaves petiolate, broadly ovate; heads pale purple, 3 mm. high, long-pediceled, in broad, lax panicles.

Eupatorium Vitalbae DC.—Shore, east of the laboratory, *Woodworth & Vestal* 718. A large, woody vine, almost glabrous; leaves short-petioled, oblong-ovate, 3-nerved, coarsely toothed, thick and lustrous; heads pink or purple, 10-12 mm. high, in small corymbs. A handsome plant because of the brightly colored flower heads.

Melampodium divaricatum (Rich.) DC. — Kenoyer & Standley (p. 158). An erect, branched, scabrous annual; leaves opposite, rhombic-ovate, narrowed to winged petioles; heads yellow, almost 1 cm. broad, with short rays, the bracts

in 2 series; pappus none. An abundant weed of Central America.

Melanthera aspera (Jacq.) Rich. JULIO, CLAVELLINA DE MONTE, SIRVULACA.—Without locality, *Shattuck* 527; edge of new garden, *Wetmore & Abbe* 37. A coarse, rough, erect herb 1-2 meters high; leaves opposite, often hastate-lobed; heads white, rayless, 1 cm. broad, the bracts ovate, in 2-3 series; anthers black, contrasting with the white corollas; pappus of deciduous awns.

Mikania boliviensis Lingelsheim. (*M. punctata* Klatt.) — Without locality, *Aviles* 500. A large, herbaceous vine; leaves deltoid-ovate, deeply cordate at the base, often somewhat lobed or angled; heads 9-10 mm. long, in pyramidal panicles. The species has not been reported for the Canal Zone.

Mikania guaco Humb. & Bonpl.—Standley (Suppl. 129). An herbaceous or woody vine; leaves ovate, subentire, nearly or quite glabrous, the blades abruptly decurrent upon the petiole; heads in cymes.

Mikania leiostachya Benth.—Standley (Fl. 31). A large, herbaceous vine; leaves opposite, oblong-ovate, rounded at the base, entire; heads white, in paniced spikes; bracts only 4 (as in other species of the genus).

Mikania micrantha HBK.—Standley (Fl. 31). An herbaceous vine, often forming dense tangles; leaves deeply cordate at the base, undulate or somewhat toothed; heads white, 5-6 mm. high, in small, dense cymes. A common weed. Flowers with the odor of vanilla.

Neurolaena lobata (L.) R. Br. CONTRAGAVILANA.—Standley (Fl. 32). A coarse, erect herb 1-3 meters high; leaves alternate, rough-pubescent, the lower deeply 3-lobed; heads yellow, rayless, 7 mm. high, in large, terminal panicles; pappus of whitish bristles.

Pluchea purpurascens (Swartz) DC. — Standley (Fl. 32). In marshes. A coarse, erect, pubescent, somewhat viscid herb; heads small, purple, in corymbose cymes; pappus of bristles.

Porophyllum ruderale (Jacq.) Cass.—Standley (Fl. 32). An erect, branched, glabrous annual; leaves alternate, opposite below, elliptic or oblong, with large glands on the margins and surface; heads bronze, rayless, 2.5 cm. long; pappus of straw-colored bristles.

Pseudelephantopus spicatus (Juss.) Rohr. ESCOBILLA

BLANCA, CHICORIA.—Standley (Fl. 32). A coarse, erect herb; leaves alternate, elliptic or obovate, dilated and clasping at the base, entire or nearly so, glabrate; heads pale purple, 4-flowered, the small clusters forming long spikes; pappus of bristles. One of the commonest of Central American weeds.

Rolandra fruticosa (L.) Kuntze. — Standley (Fl. 32). A coarse, erect herb; leaves alternate, oblong or elliptic, entire, green above, white-tomentose beneath; flower heads white, 1-flowered, crowded in dense heads along the branches; pappus a short toothed crown.

Schistocarpha oppositifolia (L.) Kuntze.—Without locality, *Aviles* 16. A coarse, erect herb; leaves opposite, large, broadly ovate, thin, petioled, dentate, sparsely pubescent; heads greenish yellow, 6-9 mm. high, paniced, rayless; pappus of soft bristles. The genus has not been recorded before from the Canal Zone.

Tridax procumbens L.—Standley (Fl. 32). A hairy, procumbent annual; leaves opposite, petioled, coarsely toothed; heads pale yellow, long-pedunculate, with very short rays; pappus of plumose-ciliate bristle-like scales. One of the abundant, lowland weeds of Central America.

Verbesina myriocephala Schultz Bip. CERBATANA, LENGUA DE BUEY.—Kenoyer & Standley (p. 158). A coarse, usually simple herb 1.5-3 meters high; leaves alternate, very large, deeply pinnatifid; heads white, 7 mm. high, in large terminal corymbs, the rays inconspicuous.

Vernonia canescens HBK. HIERBA DE SAN JUAN.—Standley (Fl. 32). A shrub, the branches often long and arching or reclining; leaves densely white-pilose beneath, alternate; heads pink or white.

Vernonia cinerea (L.) Less.—Standley (Fl. 32). A low herb; heads purple. A weed, naturalized from the Old World tropics.

Vernonia patens HBK. LENGUA DE VACA, LENGUA DE BUEY.—Standley (Fl. 32). A shrub; leaves scaberulous beneath; heads white.

Wulffia baccata (L. f.) Kuntze.—Standley (Fl. 32). An arching shrub; leaves opposite, ovate or oblong-ovate, crenate or almost entire, rough; heads yellow, 2 cm. broad, with small rays; achenes without pappus, becoming somewhat fleshy at maturity.

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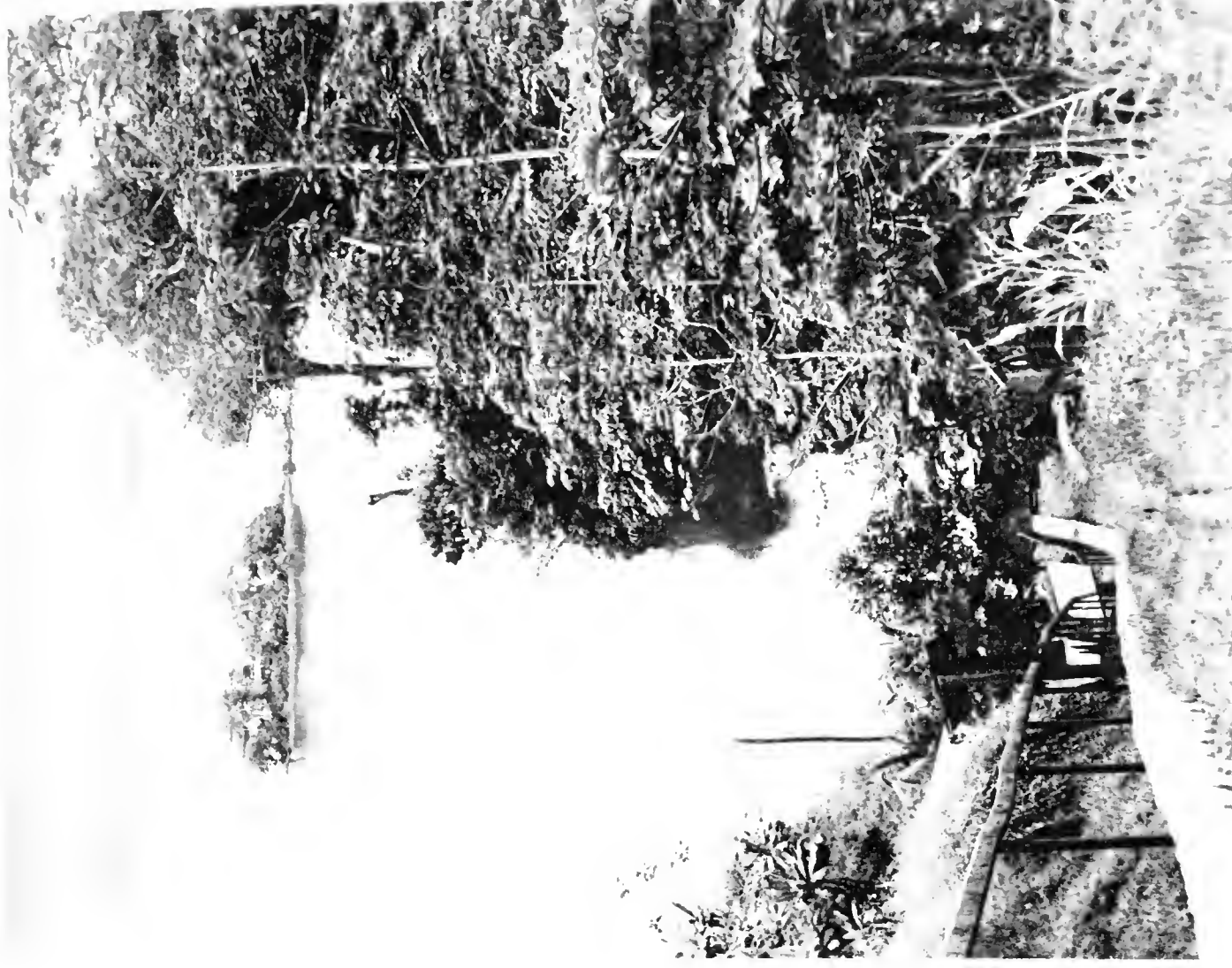


VIEW OF THE LABORATORY ON BARRO COLORADO ISLAND



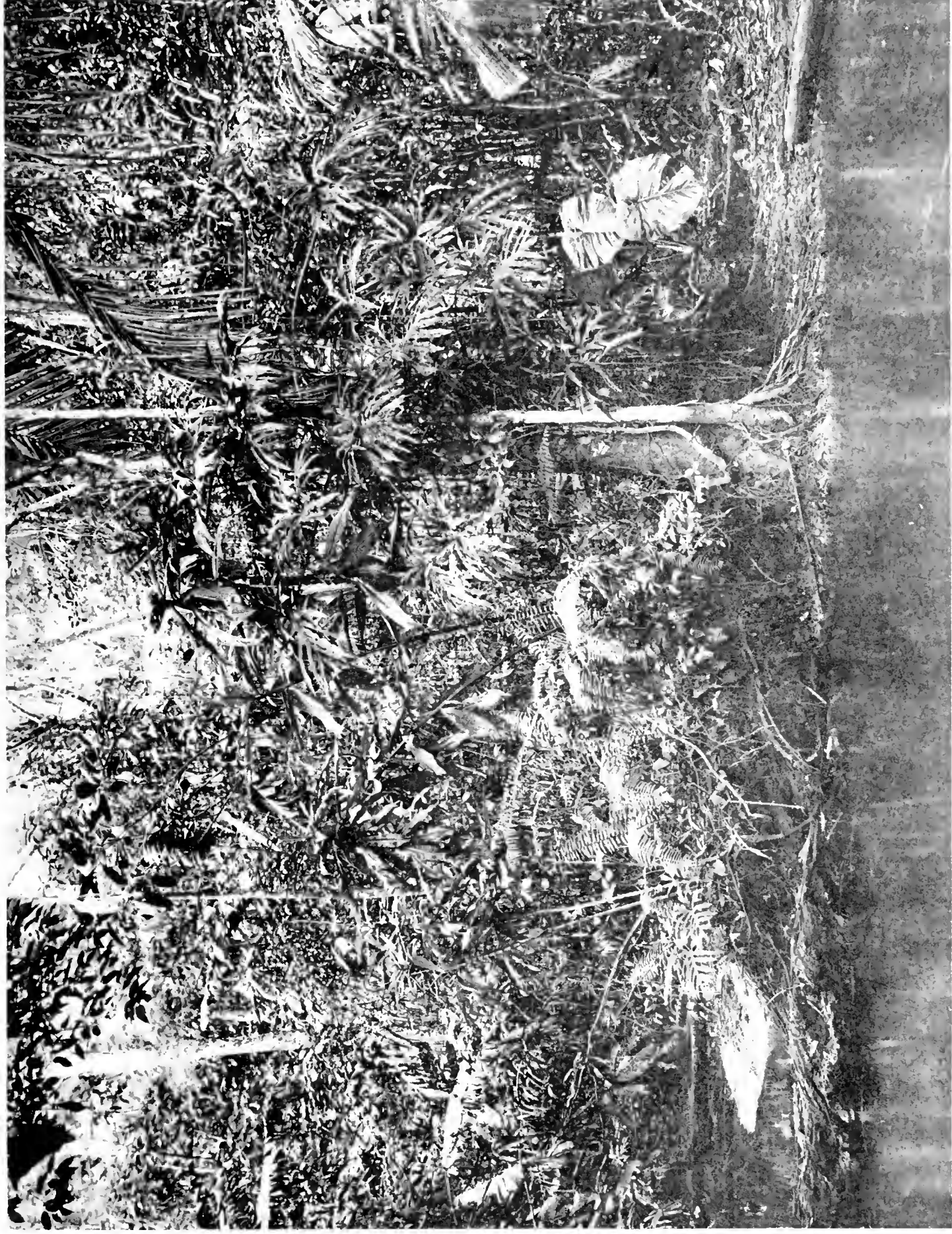
A

VIEW ACROSS THE CANAL AND GATUN LAKE FROM
ISLAND NEAR FUERTES HOUSE



B

VIEW FROM THE LABORATORY ACROSS GATUN LAKE



SHORE VEGETATION ON BARRO COLORADO ISLAND



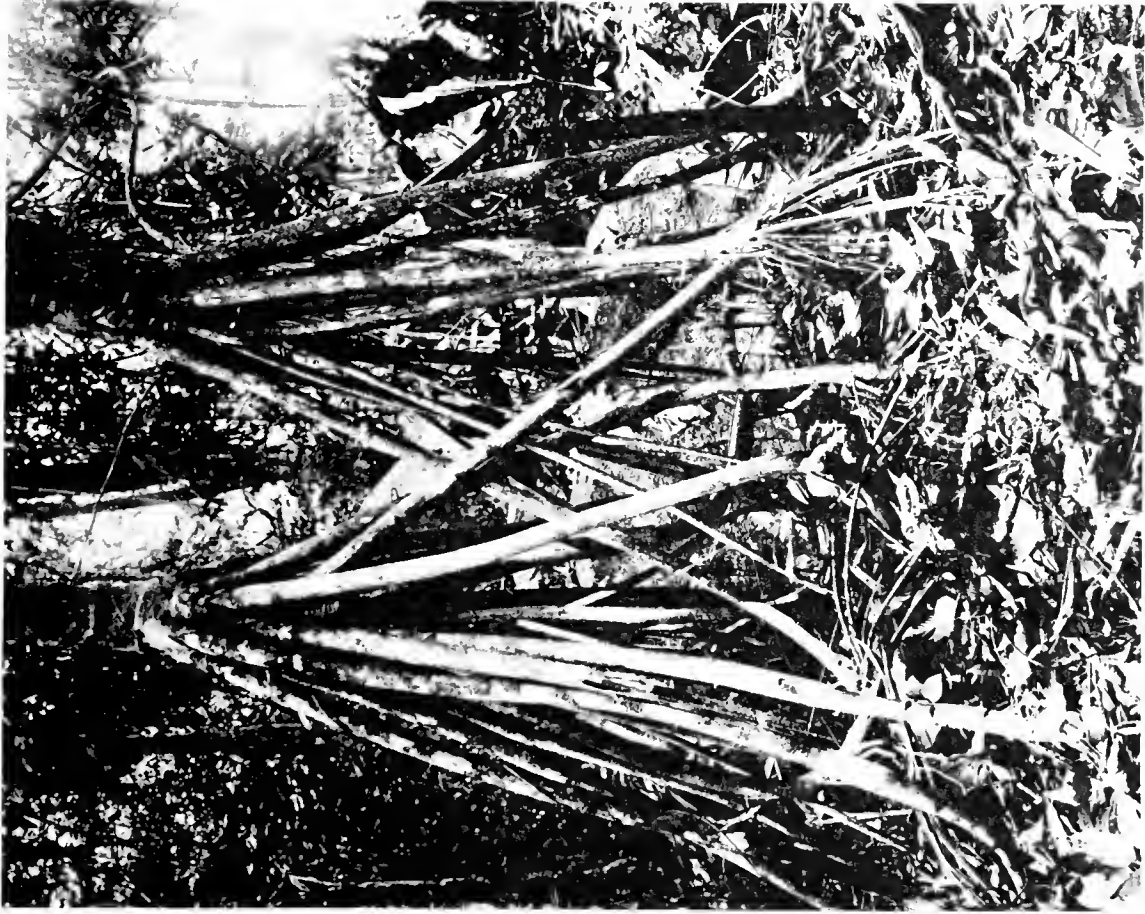
INLAND VEGETATION ON BARRO COLORADO ISLAND



A
LIANAS IN THE FOREST

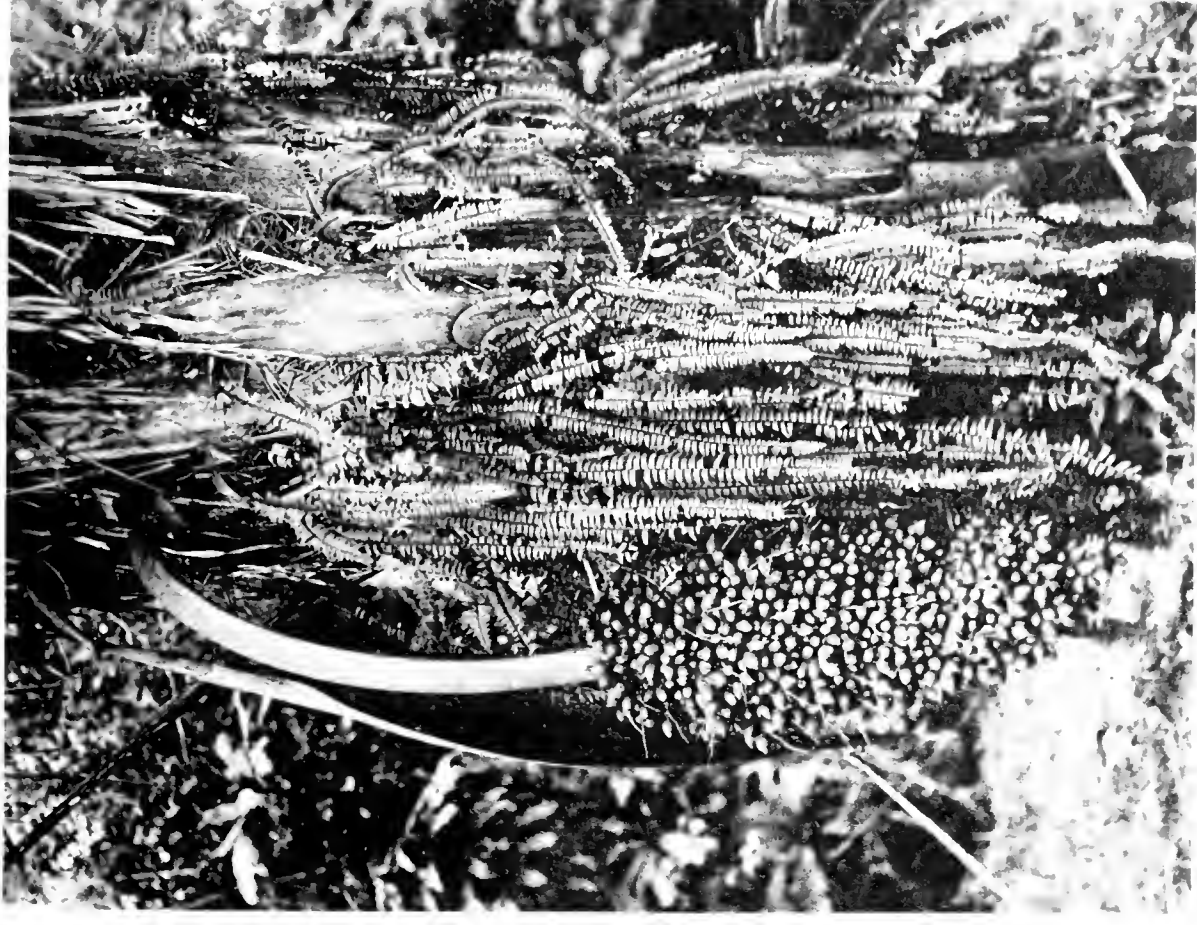


B
STRANGLING FIG, PARTS OF THE SAME PLANT ON THREE HOSTS



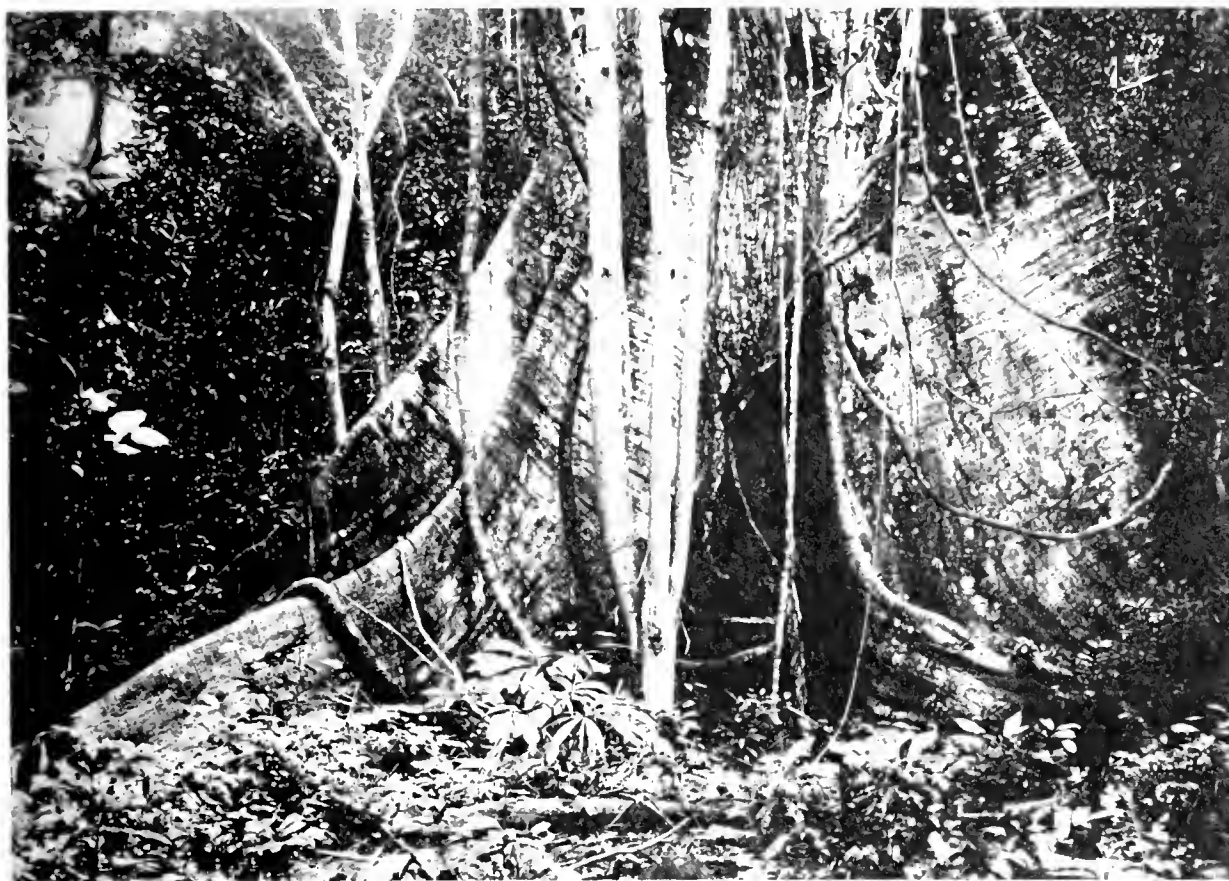
A

STILT ROOTS OF *SOCRATEA DURISSIMA*
(Oerst.) Wendl.



B

TRUNK OF *COROZO OLEIFERA* (HBK.)
L. H. Bailey, with FRUITING SPADIX



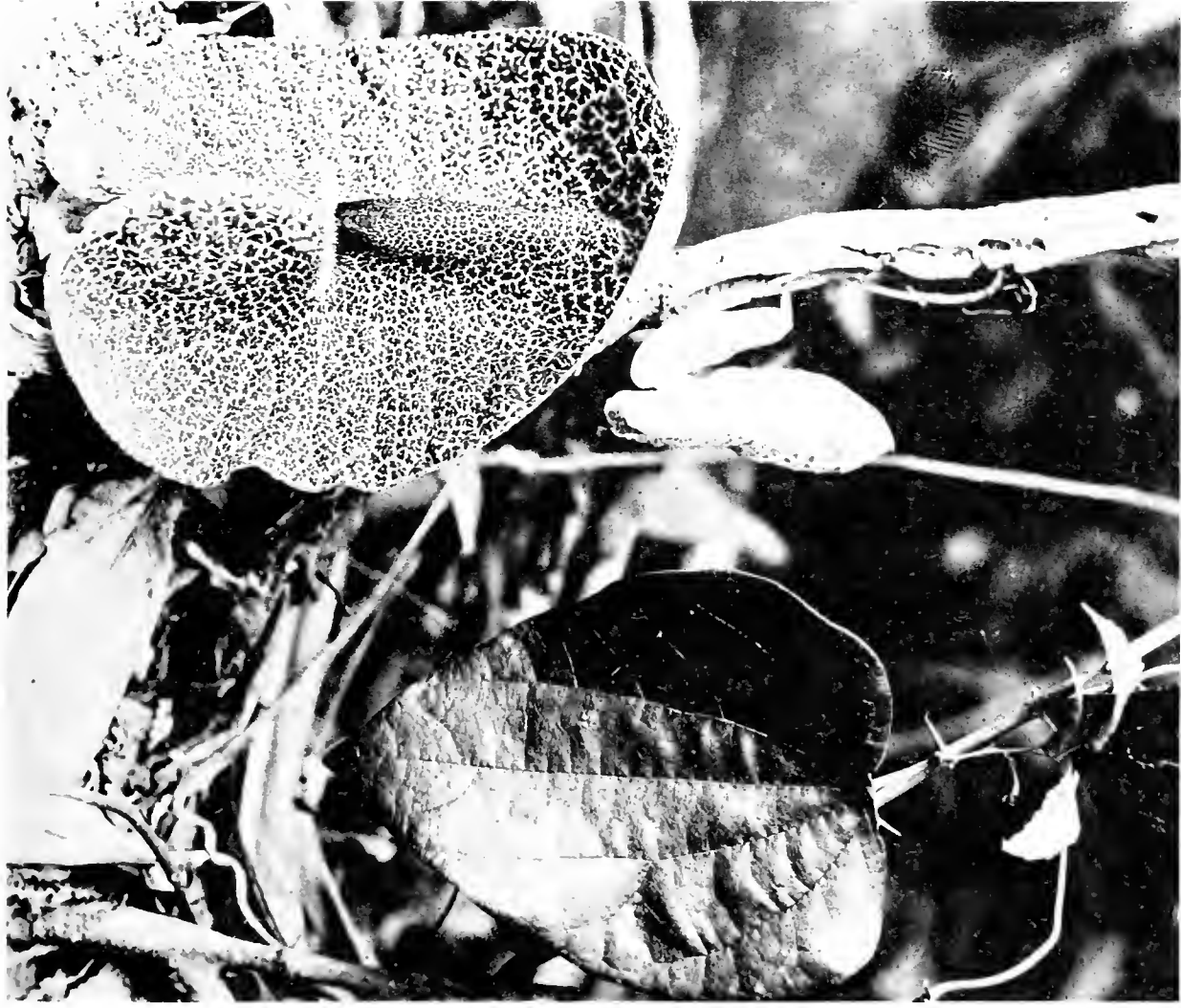
A

TRUNK OF *BOMBACOPSIS FENDLERI* (SEEM.) Pittier, THE LARGEST TREE ON THE ISLAND, ABOUT 200 FT. HIGH AND 190 FT. AROUND



B

NYMPHAEA AMPLA (Salisb.) DC., IN THE EDGE OF GATUN LAKE



A

ARISTOLOCHIA SYLVICOLA STANDL.



B

MARCGRAVIA NEPENTHOIDES SEEM.



ARISTOLOCHIA CHAPMANIANA Standley



CHONDODENDRON HYPOLEUCUM Standley



HERBARIUM
FIELD MUSEUM

PLANTS OF PANAMA *Type*
Pithecolobium barbourianum
Standley
1931, July 7
COLL. OTIS SHATTUCK
BARRO COLORADO ISLAND
CANAL ZONE

PITHECOLOBIUM BARBOURIANUM Standley



651860

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PLANTS OF BARRO COLORADO ISLAND
CANAL ZONE

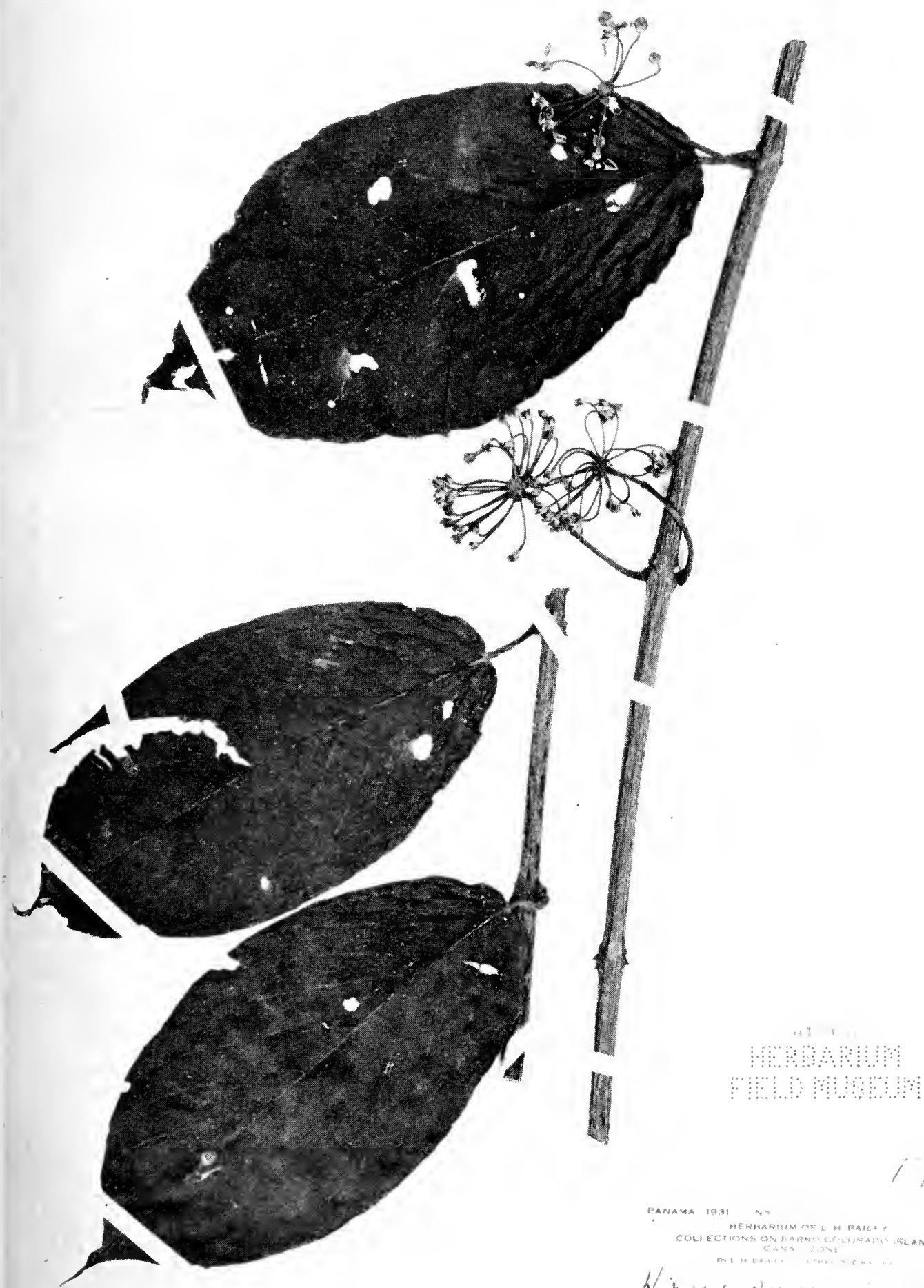
Machaerium woodworthii Standley

Machaerium woodworthii Standley
Barro Colorado Island

Dec. 1932
Collected by R. H. Woodworth and P. A. Vestal

422

MACHAERIUM WOODWORTHII Standley



HIRAEA SMILACINA Standley



PAULLINIA BAILEYI Standley



CONOSTEGIA MICROMERIS Standley



MICONIA SHATTUCKII Standley



OSSAEA DISPARILIS Standley

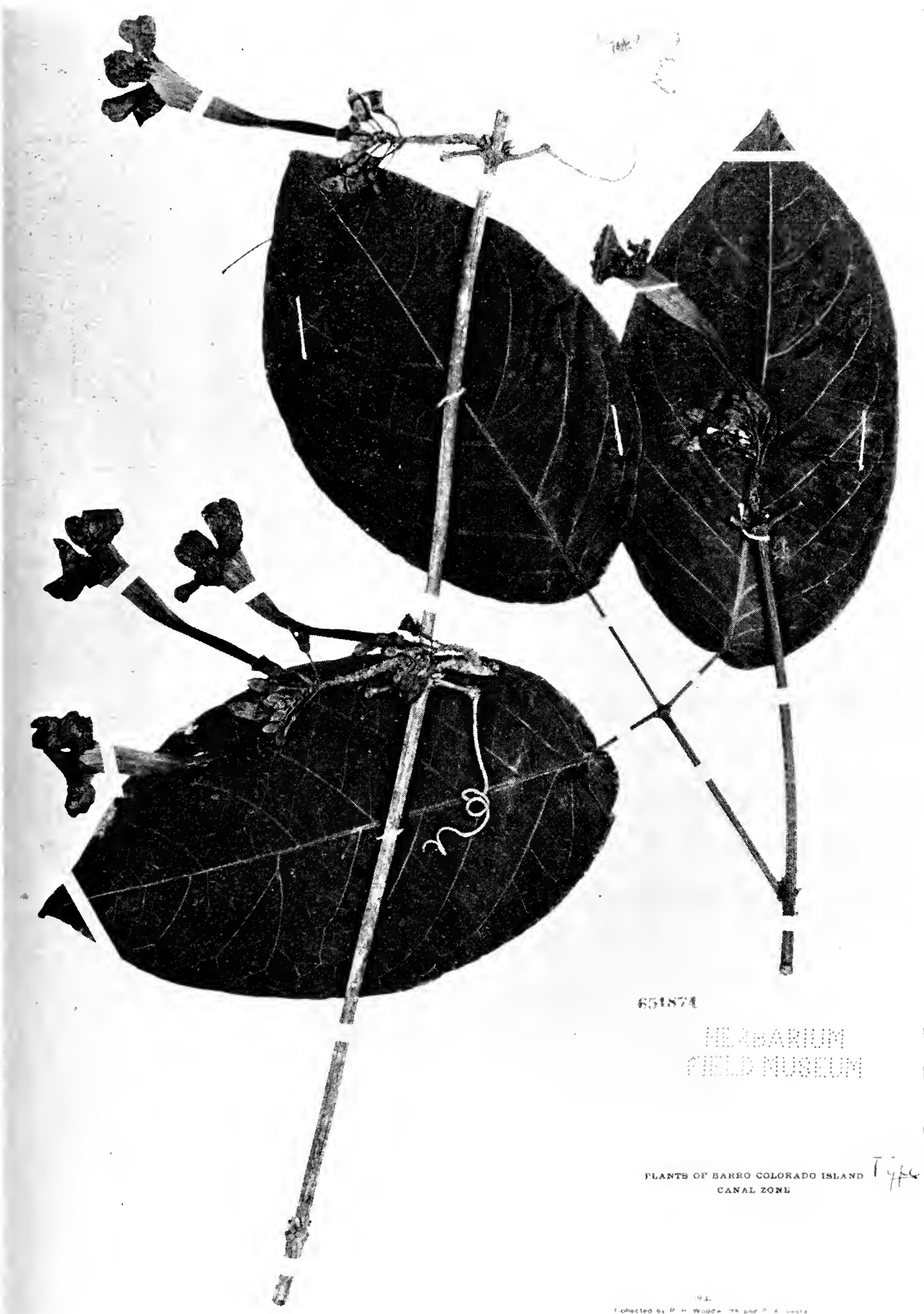


HERBARIUM
FIELD MUSEUM

PLANTS OF PANAMA *St.*
765. *Ipomoea Vestalii* Standl.

Barro Colorado
Panama

Ipomoea Vestalii Standley



651871

HERBARIUM
FIELD MUSEUM

PLANTS OF BARRO COLORADO ISLAND Type
CANAL ZONE

Collected by P. H. Woodson and H. S. Gentry

TANAECIUM ZETEKII Standley



65415
HERBARIUM
FIELD MUSEUM

PLANTS OF PANAMA *Tyler*

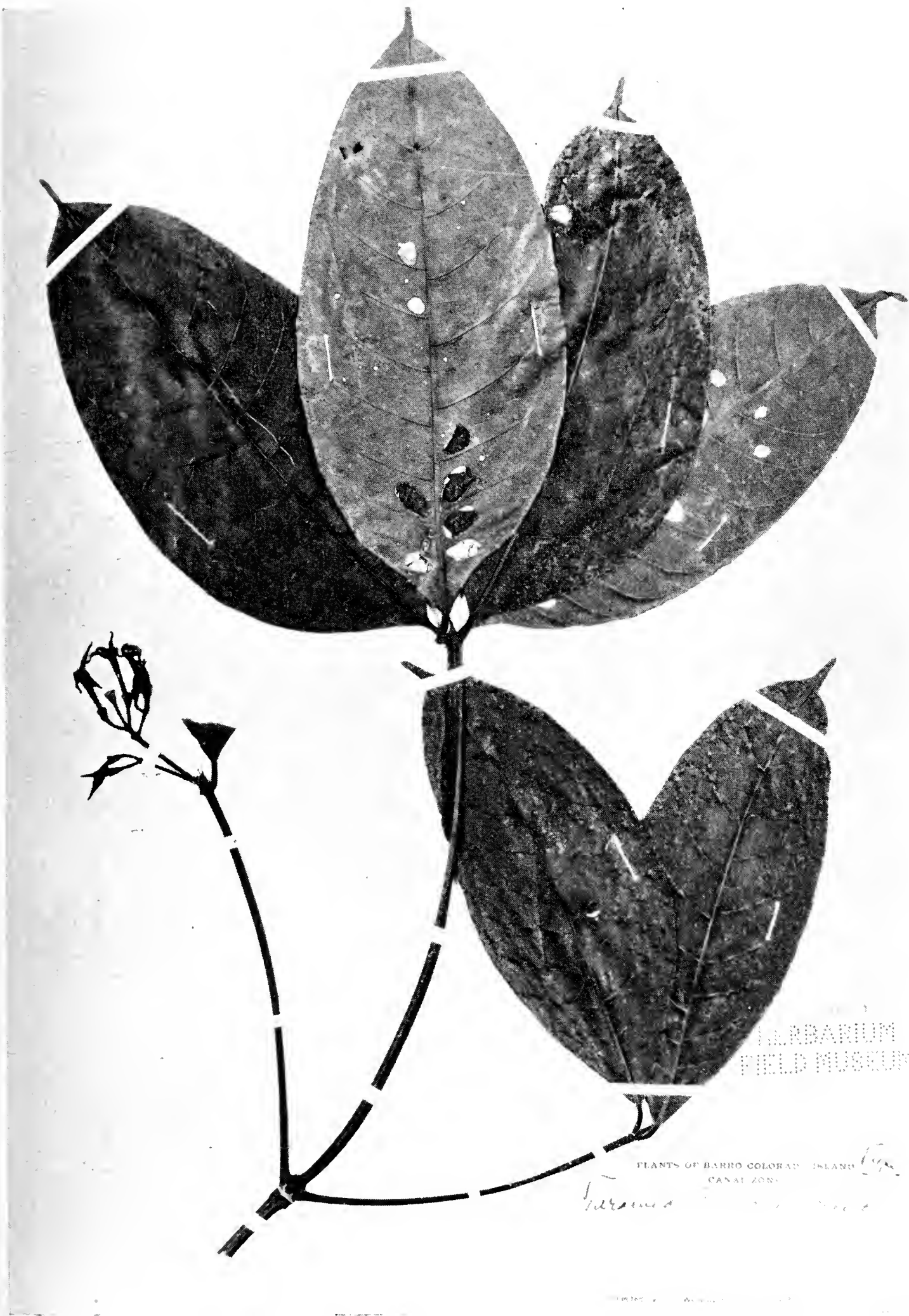
Beloperone graciliflora Standl.

Drayton Trail

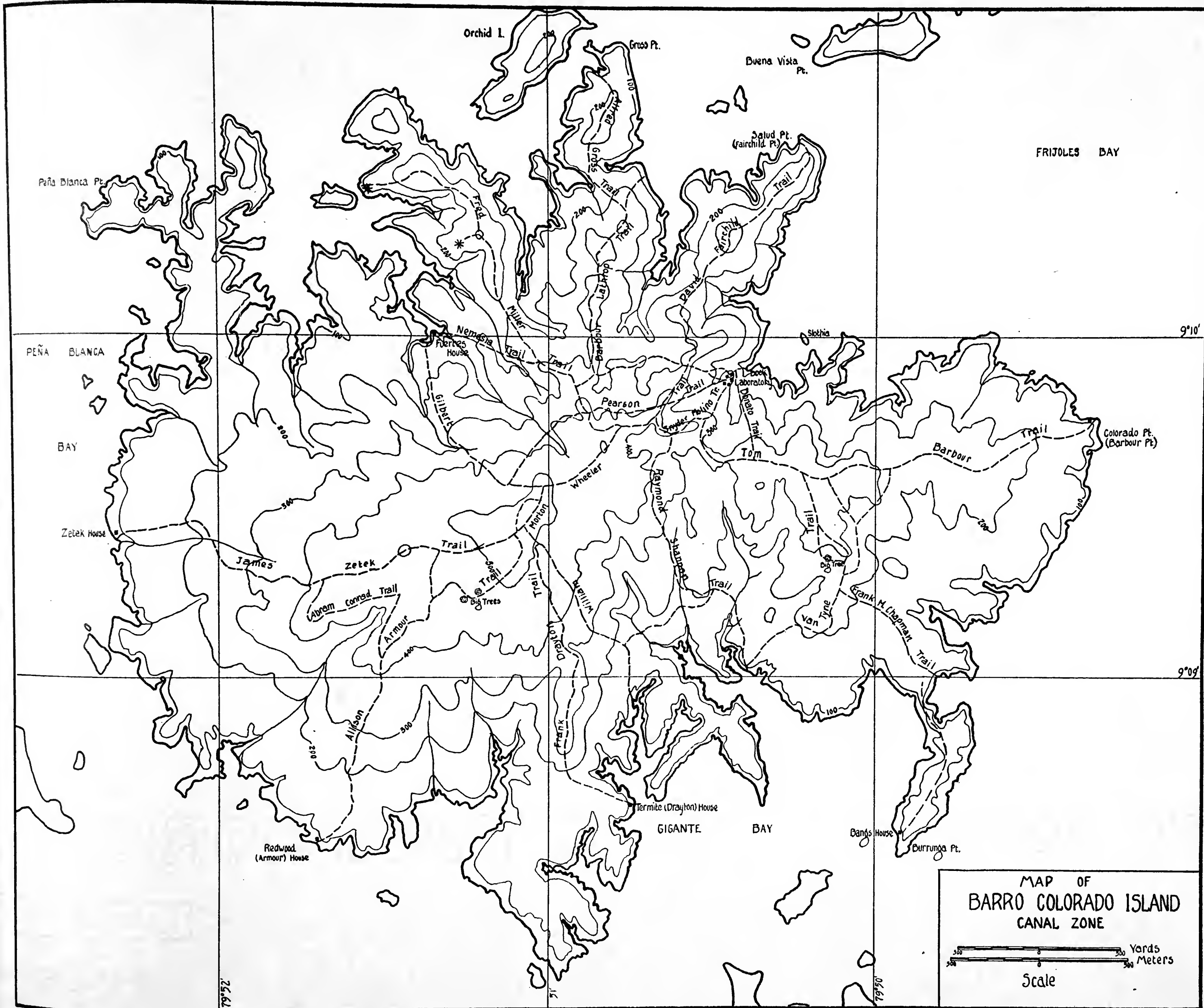
1931 7.17
COLL. OTIS SHATTUCK

BARRO COLORADO ISLAND
CANAL ZONE

BELOPERONE GRACILIFLORA Standley



FARAMEA ZETEKII Standley





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